

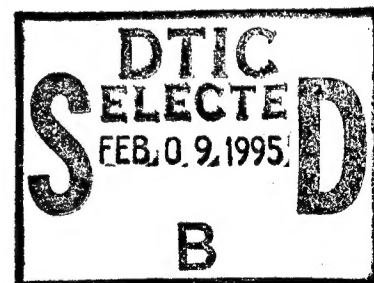


# **ENVIRONMENTAL PRACTICE IN PROGRAM MANAGEMENT OFFICES**

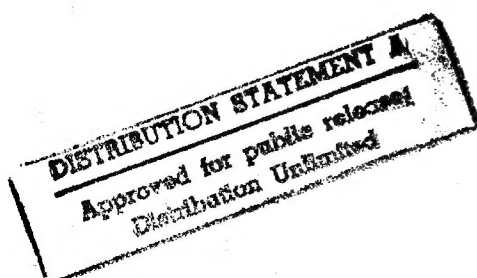
**RESEARCH REPORT**

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**GEORGE P. NOBLE III**



**Professor of  
Systems Acquisition Management  
Research, Consulting and Information Division**



**January 1995**

**ENVIRONMENTAL PRACTICE**  
**IN**  
**PROGRAM MANAGEMENT**  
**OFFICES**

**George P. Noble III**

**Professor, Defense Systems Management College**

**Research Project R-15**

**January 1995**

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# ENVIRONMENTAL PRACTICE IN PROGRAM MANAGEMENT OFFICES

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## EXECUTIVE SUMMARY

### PURPOSE

The purpose of this research project is to determine, "What is current programmatic policy and practice relative to the treatment of environmental concerns in the weapon system acquisition process; and as a corollary - if there are shortcomings in policy or practice, what are the recommended solutions?" Additionally this research deals with information dissemination in answering the question, "What are the appropriate media and mechanisms to disseminate needed environmental information to the field and how should such an objective be accomplished?"

### RESEARCH METHODOLOGY

The research involved use of both a survey questionnaire and a series of personal interviews. One hundred eighteen replies were received from Program Management Offices (PMOs) to the written survey and 40 personal interviews were conducted with Program Managers (PMs) or their representatives.

The survey covered several aspects of environmental practice in PMOs. Particular attention was focused on "organization and procedures", "implementation in contract actions", and "impacts on program."

The personal interviews were used to obtain greater insight into survey areas and to explore other topics that the survey did not address. Both the survey and interview phases of the project resulted in a rich database of information.

### ASSUMPTIONS

The following assumptions were used in this research project:

1. Assumption that environmental issues are of increasing importance to the DoD and there is a need to improve weapon systems acquisition practices in regard to these issues.
2. Assumption that while a great body of knowledge on the research topic exists, there does not exist a coherent "statement" of weapon systems programmatic practice to accomplish DoD environmental objectives.

### BACKGROUND OF THE PROBLEM

Environmental degradation is a topic of major concern to virtually every American citizen. In fact, it is an issue of world-wide importance. The foundations of environmental compliance are

firmly established in a large body of law applicable to environmental protection. Precedence has been established in this area whereby the Federal Government has waived its sovereign immunity. It is incumbent upon the Defense Systems Management College (DSMC) to assure that our students are receiving the latest guidance on environmental practices in the context of accomplishing and teaching acquisition management of weapon systems. This area is of national importance and of particular importance to the DoD. In the Secretary of Defense's 1992 Annual Report to Congress, he stated that the DoD had six specific goals related to environmental challenge - one of which is "Conducting Environmental Impact Analyses and Early Planning in the Acquisition Process."

## RESULTS

The following areas were surveyed for this project and the results are presented briefly.

### Policy And Guidance

The PMOs generally considered guidance on environmental matters to be adequate. The PMs themselves, however, expressed a greater degree of concern on the issues of policy and guidance.

Emphasis on the area is generally high throughout the Department of Defense and the Services. Recent initiatives, such as implementation of the DoD Pollution Prevention Strategy, should receive priority attention.

### Organization And Procedures

The use of Environmental Management Teams/Groups (EMT/Gs) within the program management office structure varies. The U.S. Air Force is making extensive use of this mechanism while the U.S. Navy has established such teams/groups in only a few instances. U.S. Army use of teams/groups is uneven.

Environmental staffs are available to most PMOs and are considered most useful.

Most PMOs and PMs were satisfied with the procedures and processes in place within their offices, although some differences were noted. The use of "environmental quality management" tools was almost non-existent.

### Reference Materials

The collections of environmental reference materials in PMOs were on the sparse side. National Aerospace Standard 411, "Hazardous Materials Management Program," was on hand in only 25 of

118 reporting PMOs. Environmental management software tools are few and not in wide spread use.

### Documentation Processes

Fewer than half of the PMOs surveyed can be considered as having robust Programmatic Environmental Analysis (PEA) processes in place. It must be recognized that several older programs in the database have been "grandfathered" from the PEA process and associated documentation.

National Environmental Policy Act (NEPA) documentation requirements have been met by approximately half the PMOs. Similar levels of accomplishment were reported for Environmental Analysis, Annex E, of the Integrated Program Summary document.

### Funding

The processes for identifying and providing funds for environmental requirements were viewed unfavorably by PMOs. While the amount of funds required is not deemed to be particularly large, there is much frustration with the administrative processes involved.

### Contracting Actions

PMOs report significant activity in implementing environmental requirements in contract actions. Contract documents have been screened to identify requirements for use of Class I Ozone Depleting Substances. The PMs were generally positive in their assessments of environmental performance by their contractors.

Incentive or award fees have not been used to any great extent in the environmental area and neither has past environmental performance been adopted for use as a source selection factor. Approximately half of the responding programs reported incorporation of environmental requirements into their contractors' System Engineering and Manufacturing Management Plans.

### Technology

Innovative environmental technologies are being applied to an increasing number of programs. The National Defense Center for Environmental Excellence is not well known to or used by the program management community.

### Training

Environmental training for PMs and their staffs has not been accomplished to any significant extent. Even those personnel who

reported some training rarely had more than orientation level exposure.

### Audits And Inspections

Environmental auditing of weapon systems acquisition programs has been conducted in a rather limited fashion. Emphasis should be placed on a positive audit program to improve environmental practice as opposed to "punitive" inspections.

### Impacts Of Environmental Issues

Environmental issues are receiving command emphasis and this priority is to be commended.

Programs have been impacted by virtually all of the environmental issues (factors) that have received attention on the National scene. Ozone depleting substances, toxics, volatile organic compounds, noise and petroleum products are just some of the areas with which programs have had to contend.

Cost and schedule of numerous weapon acquisition programs have been adversely impacted by environmental issues and are requiring increased management attention. In several cases, testing programs were disrupted due to environmental issues.

### CONCLUSIONS/RECOMMENDATIONS

The development and implementation of sound environmental practice is uneven across the spectrum of DoD weapon system program management offices. The level of compliance with environmental laws and regulations needs to be improved if progress is to be made toward a standard of excellence. Command emphasis seems to be high and the efforts of environmental staffs are making major positive contributions to accomplishment of environmental requirements.

The DoD needs to improve the mechanisms and the integration of responsive funding processes to meet environmental needs. Other areas that require aggressive action are in enhancing environmental training of PMs and their staffs, improving communications relative to environmental issues so as to avoid duplicative work efforts, expand the use of Environmental Management Teams/Groups (EMT/Gs), expand the application of the Programmatic Environmental Analysis (PEA) process and expand dissemination of information concerning application of National Aerospace Standard 411.

Specific observations and recommendations are presented in each applicable section of this report.

## INTRODUCTION AND RESEARCH METHODOLOGY

### INTRODUCTION

A major task of the Department of Defense Weapon System Program Manager is the integration of multiple functions and disciplines into a coherent and effective weapon system acquisition program. In recent years, program managers (PMs) and their staffs have been required to integrate the requirements of National (as well as State and local) environmental laws into virtually every acquisition process. The Services and the PMs have accomplished much in meeting environmental requirements, but the process is evolutionary and requires both creativity and aggressive action to achieve results.

In early 1993, a number of Defense Systems Management College (DSMC) faculty held a general opinion (based largely on anecdotal information) that the application of environmental requirements within the acquisition community was uneven in practice. By August 1993, a research project focused on environmental practice had been developed and proposed. The August 1993 proposal may be found at Annex A; with the project history and general discussion found in Annex B. The project was approved on 25 October 1993 and funded the following month. Project activities extended through 1994 and are culminated with this report.

### RESEARCH METHODOLOGY

#### Research Objectives

The research objectives, as posed in the 27 August 1993 proposal, were:

(1) What is current programmatic policy and practice relative to treatment of environmental concerns in the weapon systems acquisition process; and as a corollary - if there are shortcomings in policy or practice, what are the recommended solutions?

(2) What are the appropriate media and mechanisms to disseminate needed environmental information to the field and how should such an objective be accomplished?

In addition to a search of the pertinent literature, there were two primary mechanisms used to accomplish the research. The first was a survey questionnaire, "Environmental Practice in Program Management Offices", that was mailed to 197 program managers. A copy of the questionnaire is at Annex C. The second



research tool was a series of semi-structured interviews of 40 PMs. The interview outline is at Annex D. The interviews supplemented information gained from the questionnaires and in some cases, explored topics that the questionnaire had not addressed.

## Survey Questionnaire

### Description

The survey questionnaire, Annex C, contained 45 questions organized into ten areas of inquiry. While the survey was conducted in an environment of anonymity, the first section did contain five questions relating to demographic information pertinent to the responding program management offices. Major topical areas of the questionnaire included; Organization and Procedures, Implementation in Contract Actions and Impacts on Program. There were also relatively fewer questions relating to Dealing with Environmental Risk, Funding, Training, Testing, Environmental Technology and Use of Environmental Quality Management Tools. While PMs were asked to give their personal attention to the questionnaire, there was no mechanism to assure this occurred.

### Demographics

Of the 197 questionnaires mailed, 118 were returned for a response rate of 60%. Table 2-1 provides the breakout of responding program management offices (PMO) by Service. Responding PMOs represented the gamut of weapon systems and their relative representation in the sample is at Figure 2-1.

**Table 2-1. PROGRAM MANAGEMENT OFFICE (PMO) SURVEY RESPONDENTS**

<u>Service</u>	<u>Number of PMOs</u>
U.S. Army	47
U.S. Air Force	26
U.S. Navy	33
U.S. Marine Corps	3
Joint Programs	9
TOTAL	118

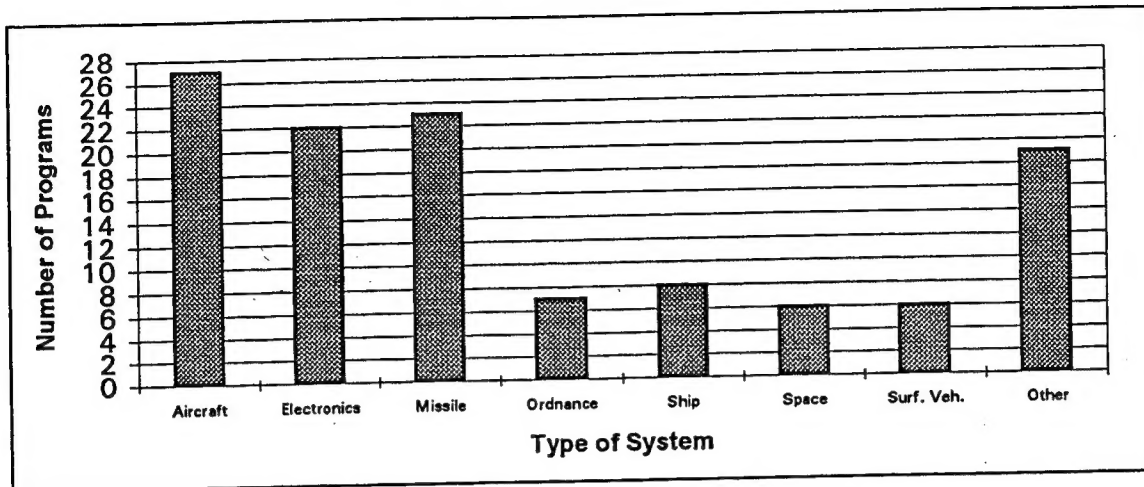


Figure 2-1. SURVEY SAMPLE (Type of Programs by System)

Responding programs also came from each of the DoD defined Acquisition Categories (ACAT), with 20 PMOs reporting their programs to encompass two or more ACATs. These situations usually represent a program with variants or major modification elements, or a "basket" PMO with individual projects falling into two or more ACATs (Figure 2-2). Several (43) program management offices (PMOs) also reported they were involved in two or more phases of the acquisition life cycle process. The same rationale as for "Multi-ACAT" PMOs is applicable here. Distribution of the remainder of the programs, in terms of acquisition phase, is at Table 2-2. The last demographic feature surveyed dealt with the size, in terms of personnel spaces, of the reporting PMOs. The size distribution is at Table 2-3. The sample of 118 programs is robust in that it represents a broad spectrum and the acquisition PMO community as a whole.

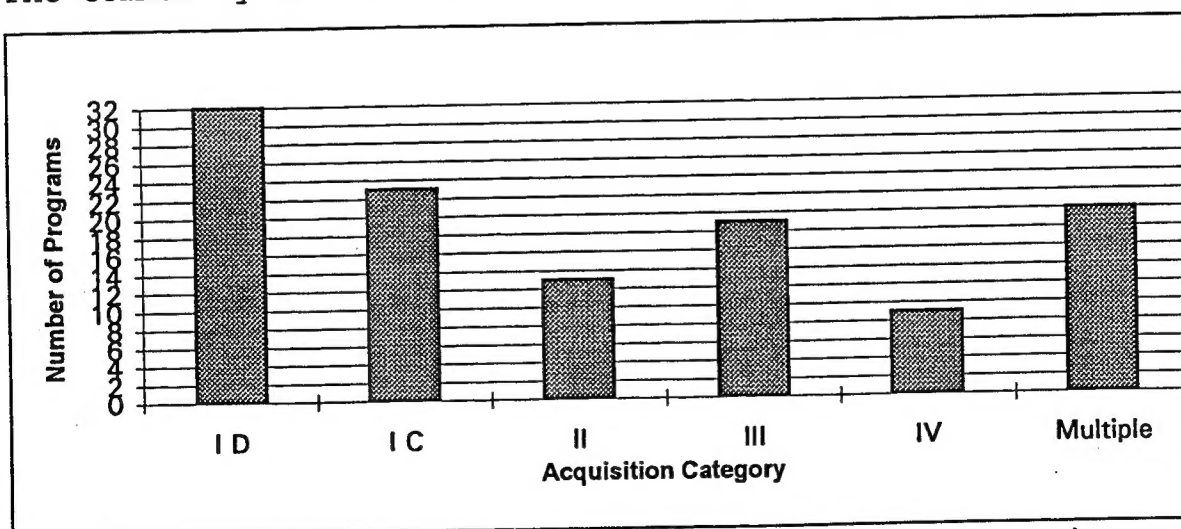


Figure 2-2. SURVEY SAMPLE (Programs by Acquisition Category)

**Table 2-2. PROGRAMS by ACQUISITION PHASE**  
(Survey Sample)

<u>Acquisition Phase</u>	<u>Number of Programs</u>
Phase 0: Concept Exploration & Definition	3
Phase I: Demonstration & Validation	7
Phase II: Engineering & Manufacturing Development	24
Phase III: Production & Deployment	31
Phase IV: Operations & Support	9
Multiple Phases	43
No Response	1
TOTAL	<u>118</u>

**Table 2-3. PROGRAM MANAGEMENT OFFICES (PMOs) by SIZE**  
(Survey Sample)

<u>Personnel Spaces</u>	<u>Number of PMOs</u>
Less than 10	13
11 to 25	29
26 to 50	31
51 to 100	19
More than 100	26
TOTAL	<u>118</u>

## Interview

### Description

The project's PM interview phase involved a series of face-to-face sessions lasting approximately one hour each. A semi-structured format was used with the interview outline included at Annex D. Topical areas addressed in the interview process included Importance of Environmental Issues (to include Impacts), Organization and Procedures, Contracting Actions, Funding, Training and Technology. During the interviews, many comments and anecdotes were captured. This information is provided, in part, at appropriate places within the report. (Comments provided on the survey forms, while not as extensive, have also been provided where appropriate.)

### Demographics

### Demographics

While non-attribution and anonymity were the ground rules for interview sessions, demographic information was obtained for analysis purposes. Twenty-one U.S. Army, nine U.S. Air Force and ten U.S. Navy PMs were interviewed. While it was attempted to interview PMs personally, in some cases this was not possible and designated representatives were interviewed instead. The actual interview sample is at Table 2-4.

**Table 2-4. INTERVIEW SAMPLE**

Program Managers (PMs)-----	24
Deputy Program Managers (PMs)--	8
Designated Representatives-----	8
TOTAL	40

During some interviews, PMs elected to have members of their staff participate. This occurred approximately one-third of the time. Staff participation was minimal and in no way appeared to inhibit or unduly influence PM responses. The PMs were from programs of every ACAT and acquisition life cycle phase (one exception, zero "Concept Exploration and Definition" representation); however, ACAT Is were heavily represented (24) with the remainder of the programs being fairly well distributed across II, III, IV and multiple categories. The distribution by acquisition phase was also somewhat skewed with the latter phases of the life cycle having greater representation. See Table 2-5.

**Table 2-5. PROGRAMS by ACQUISITION PHASE**  
(Interview Sample)

<u>Acquisition Phase</u>	<u>Number of Programs</u>
Phase 0: Concept Exploration & Definition	0
Phase I: Demonstration & Validation	3
Phase II: Engineering & Manufacturing Development	6
Phase III: Production & Deployment	9
Phase IV: Operations & Support	6
Multiple Phases	16
TOTAL	40

## ENVIRONMENTAL POLICY AND GUIDANCE

Issues of environmental compliance and pollution prevention have been receiving increased attention and emphasis in the acquisition process. The production, operation and maintenance of weapon systems has been cited as the source for more than 80 percent of DoD's hazardous waste problem.<sup>1</sup> While the DoD has made major effort to comply with National environmental laws, its implementation of environmental policy has been assessed by the DoD Inspector General's office as "not consistent" and "not totally effective."<sup>2</sup>

The establishment of the Deputy Under Secretary of Defense, Environmental Security position in March 1993 is an indicator of the increasing emphasis being placed within DoD on the environmental area. On the National level, the issuance of Executive Order 12856 in August 1993 specifically addressed pollution prevention as an integral part of the Federal Government's acquisition practices.<sup>3</sup> In addition, each Service has regulations in place to provide environmental policy and guidance.<sup>4,5,6</sup> States and local jurisdictions frequently have laws and regulations, dealing with environmental issues, that can impact the operation of Government facilities and acquisition programs.

Program managers (PMs) are faced with a complex universe of laws, orders, policies, regulations and directives when implementing environmental compliance and pollution prevention measures in their weapon systems programs. Research of this area revealed some contradictory assessments of the adequacy and effectiveness of the policy/guidance arena.

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<sup>1</sup>DODIG Inspection Report, 93-INS-06, Hazardous Waste Minimization, 28 December 1992.

<sup>2</sup>DODIG Audit Report, 94-020, Environmental Consequence Analyses of Major Defense Acquisition Programs, 20 December 1993.

<sup>3</sup>Executive Order 12856, Federal Compliance with Right-to-Know and Pollution Prevention Requirements, August 3, 1993.

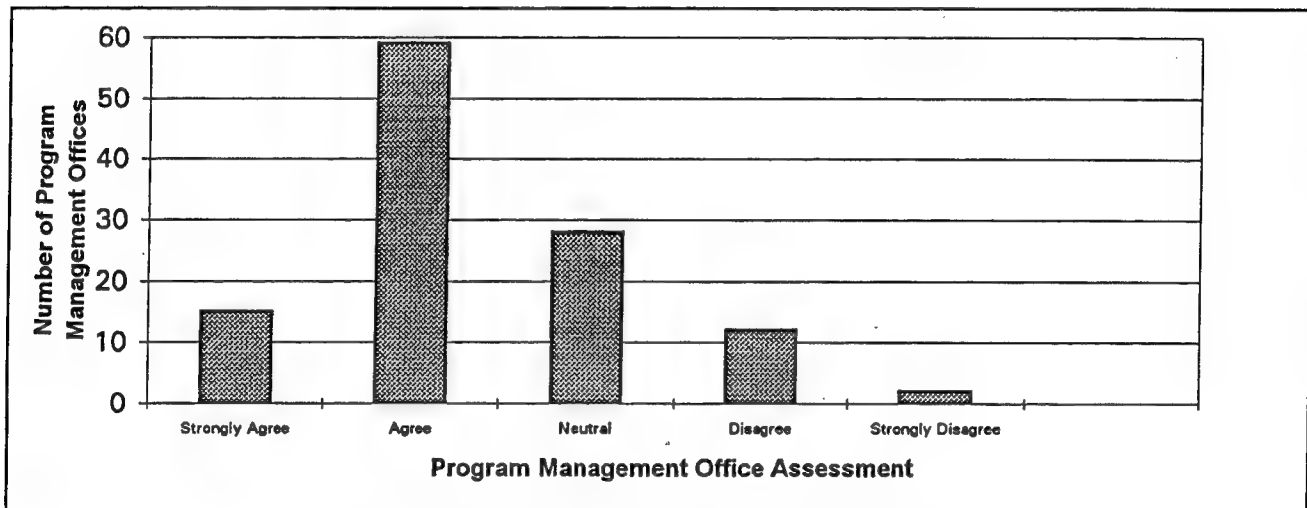
<sup>4</sup>Army Regulation 200-2, Environmental Effects of Army Actions, 23 December 1988.

<sup>5</sup>Air Force Regulations 19 (-1 to -14), "Air Force Environmental Regulations", various dates.

<sup>6</sup>OPNAVINST 5090.1A, Environmental and Natural Resources Program Manual, 2 October 1990.

## RESULTS

Program management offices (PMOs) generally assessed current guidance for environmental compliance as being adequate. Of the 16 PMOs reporting disagreement with this characterization, almost half (7) of them were from the U.S. Navy. The remaining PMOs reporting disagreement were spread amongst the Army (4), Air Force (3) and Joint (2) programs. Figure 3-1 provides the PMO assessment of adequacy of environmental guidance.



**Figure 3-1. ENVIRONMENTAL GUIDANCE (Adequate)**

During the interviews, when PMs were queried as to the adequacy of environmental guidance, a higher degree of disagreement surfaced. More than half (21) of the 40 PMs interviewed expressed concern about the adequacy of environmental guidance. See Figure 3-2. In this case, PMs of every Service expressed problems with environmental guidance. Only 13 PMs (9 U.S. Army, 3 U.S. Air Force, 1 U.S. Navy) agreed or strongly agreed that environmental guidance was adequate.

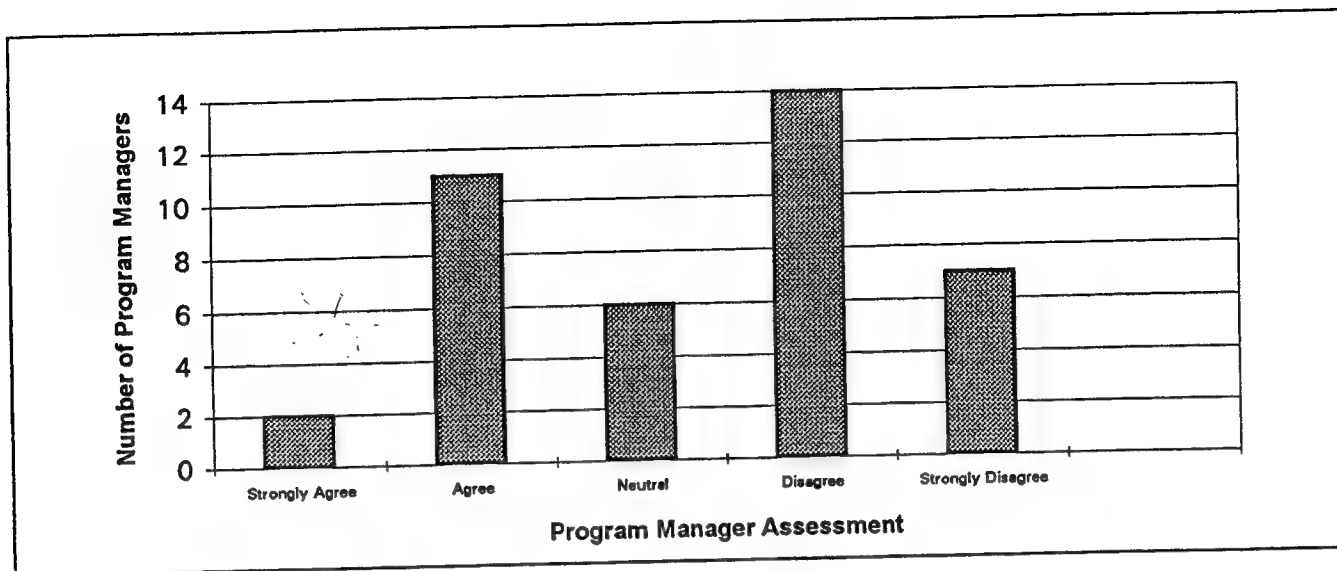


Figure 3-2. ENVIRONMENTAL GUIDANCE (Adequate)

While PMs were concerned about the adequacy of guidance, they did not share the same level of concern when queried as to the degree of attention environmental issues were receiving. Thirty-five PMs opined that environmental issues received an appropriate level of attention. Half a dozen PMs voiced the idea that environmental issues may be getting more attention than they deserve. Two PMs, who did not think proper attention was given environmental matters, made interesting observations: (1) still doesn't get level of attention it deserves because too many people still view environmental issues as roadblocks - not contributing to the mission (sic) and (2) too many people with separate agendas - they don't understand your program and are looking for "cash cows."

#### OBSERVATIONS

Difficulties with adequacy of environmental guidance are found in every Service; however, this does appear to be an issue of greater significance within the U.S. Navy acquisition community. The PMOs, who disagreed or strongly disagreed with the adequacy of environmental guidance, offered a number of insightful comments on the subject. These comments are summarized in Table 3-1.

**Table 3-1. PROGRAM MANAGEMENT OFFICE (PMO) COMMENTS re GUIDANCE**

- We are busily developing reaction strategies to environmental concerns. We need to stop and think.
- Clearer guidance in respect to environmental policy is needed. Furthermore, funding commitment must follow any policy in order for it to be effective.
- There is a patchwork of overlapping State and Federal regulations. For the most part, .... State law is more stringent than U.S. Contractors are required to "build in" the cost of compliance with State law in their proposals to us.
- No training or concise description of requirements is available to the PM.
- Ozone depleting chemical (ODC) elimination is currently a high priority issue within the project office. Little direction has been provided by DoD. It would be beneficial to have some training opportunities in this area.
- Higher level guidance is lacking. Restating the requirement or law is not guidance.
- The point that this PM would like to make is that we don't need more direction. We need an efficient process to work through the maze of requirements. Most programs can't afford their own special environmental specialist. Put together a checklist that gets us from A to Z without spending a million dollars. One last thing, get the Services to quit putting together their own implementation guides. It's killing the managers of Joint programs!

Adequacy of environmental guidance was a high energy topic with PMs. Several of them expressed frustration with environmental policies and guidance. The observations of the PMs are summarized in "bullet" form in Table 3-2. Recurring themes include organization and procedures, references, funding, contracting and training. Further information on these areas may be found in other sections of this report.

Environmental issues are an area of emphasis and, in general, the acquisition community is paying attention to them. There is a danger that programs can be adversely impacted by being unfairly burdened with environmental issues that extend well beyond the scope of the program's activities.



**Table 3-2. PROGRAM MANAGER (PM) COMMENTS re GUIDANCE**  
(As grouped by the author)

Organization and Procedures

- Gap in the middle of the chain of command.
- Metrics that look good as opposed to realistic.
- Too much bureaucracy.
- Need more lead time. ODCs were a "surprise."
- Top doesn't understand what it means at field level.
- Lack of OSD specificity on tri-service requirements.
- Need prioritization.
- Need to get an agreed upon baseline.
- Lots of info, lots of visibility, chain goes from Congress direct to me.
- Little reality check with "tree hugger" mentality.
- Need to determine what is mandatory and what is not. Get "Checker" agreement.
- Difference between what Federal Government is imposing on us and the public at large.
- First guy up is implementer.
- Reactive rather than proactive.

Reference Materials

- Too much conflicting guidance.
- Federal/State differences.
- Legal requirements.
- Laws are confusing.
- Adequate at macro level.
- 5000.2 has no details.
- Dealing with State/National laws.
- Inconsistency.
- Guidance on how to do it.
- Legal guidance. Dozens of pieces of legislation.
- Need "how to's." More than just the law.
- Adequate in philosophy, but implementation guidance is lacking.
- Legislation and interpretation is in flux.
- Piecemeal.
- Interpretation of law and translation into policy.

Funding

- How to handle funding requirements.
- Cannot justify necessary expenditures.
- Guidance doesn't provide resources.
- Providing resources.
- LCCE is an impossible task.
- How to fund environmental issues.
- Funding for compliance.
- Guidance never provides resources. Not one red cent!

Contracting Actions

- Details on use of SPECS and STDs.
- Some problems out of scope.
- Need better contract mechanisms to work pollution prevention problem.
- Some conflicts. Need contracting language.
- Plans and forms required.
- Procedures to determine liability.

Table 3-2 continued:

Training

- NEPA process and how it applies.
- Responsibilities other than Federal.
- How to deal with EPA 17.
- What to look for in different phases of development.
- Basic Best Practices.
- Practical engineering decision making tools.
- Specifics on ODCs barely adequate, it's a complex field.
- Majority of people implementing environmental guidance do not have technical background or training.

RECOMMENDATIONS

Understanding and improved implementation of environmental requirements can be enhanced by continued emphasis on developing clear and realistic guidance. The areas of organization and procedures, references, funding, contracting and training all need to be addressed. Particular attention should be paid to implementing the objectives of the Department of Defense Pollution Prevention Strategy.<sup>7</sup>

Acquisition programs should not be used as "stalking horses" or "cash cows" for the furtherance of environmental agendas or initiatives that extend beyond the scope of the program's mission oriented activities.

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<sup>7</sup>Memorandum, Comprehensive Pollution Prevention Strategy, The Secretary of Defense, 11 August 1994.

## PROGRAM MANAGEMENT OFFICE-ENVIRONMENTAL ORGANIZATION & PROCEDURES

A critical factor in the implementation of environmental requirements within acquisition Program Management Offices (PMOs) is how the PMOs organize internally for this function. In addition, the availability and interaction with professional environmental staff support can have significant impact on PMO actions. These two aspects of organization, as well as the decision making and management processes employed, were investigated.

### RESULTS

#### Environmental Management Teams/Groups

The use of Environmental Management Teams/Groups (EMT/Gs) has been recognized by the U.S. Army and U.S. Air Force acquisition communities as a key mechanism for accomplishing the environmental requirements associated with development and execution of an acquisition program. "The concept of an Environmental Management Team (EMT) is essential to successfully incorporating pollution prevention into the acquisition process."<sup>1</sup> An EMT should be selected and appointed very early in the life cycle of an acquisition program.<sup>2</sup> The Air Force Materiel Command Acquisition Pollution Prevention Implementation Guide makes a parallel statement, "First form an Environmental Working Group (EWG) within your program office."<sup>3</sup>

At the time of the research survey, the EMT/G concept does not appear to have been adopted as a part of the U.S. Navy's approach to environmental management within PMOs. However, three offices reported the existence of such groups. Information as to the establishment of EMT/Gs within all the Services, as well as the Joint PMOs, is shown in Table 4-1. The U.S. Air Force has been most aggressive in making use of this organizational approach.

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<sup>1</sup>Materiel Developer's Guide for Pollution Prevention, HQS, Army Materiel Command, Acquisition Pollution Prevention Support Office, 28 August 1992, page 70.

<sup>2</sup>Life Cycle Environmental Guide for Weapon Systems Project Managers, U.S. Army Production Base Modernization Activity, October 1992, Section II, Para. 1.1.B, Page 14.

<sup>3</sup>Air Force Materiel Command Acquisition Pollution Prevention Implementation Guide, Revision I, 30 December 1993, Volume I, Section IV, Para. 4.0, page 22.

**Table 4-1. ENVIRONMENTAL MANAGEMENT TEAMS/GROUPS (EMT/G)**

<u>Programs Reporting EMT/G Have Been Established</u>		
<u>Service</u>	<u>YES</u>	<u>NO</u>
U.S. Army	14	33
U.S. Air Force	21	5
U.S. Navy	3	30
U.S. Marine Corps	0	3
Joint Programs	5	4
TOTAL	43	75

Program managers (PMs) with EMT/Gs were questioned, during the interview process, as to the make up and use of the EMT/Gs. In size, the EMT/Gs varied from two to over a dozen members. In some cases, the EMT/G was strictly internal to the PMO and in others external members were included. The USAF EMGs were operating within the umbrella of the USAF Integrated Product Team approach.

Seven out of 18 PMs with EMT/Gs characterized the EMT/Gs as decision making bodies while the remainder indicated the function of the group to be more of a recommendation development mechanism. Even though some groups were considered to be decision making, it was apparent that the scope of those decisions was limited and subject to review. The PMs were unanimous in judging the EMT/Gs' work and decisions/recommendations to be on target and realistic.

#### Environmental Support Staff

Most acquisition commands and agencies have established environmental support staffs to assist subordinate PMOs with environmental requirements. The availability of this internal support is as shown in Table 4-2. During the interview phase of the project (which was conducted at relatively large acquisition organizations), 39 out of 40 PMs interviewed indicated the presence of staff support. Thirteen PMs characterized the support as "Excellent" and 18 as "Adequate." Three indicated the support to be "Inadequate" and the remainder of the PMs (6) either hadn't made use of the support or believed they could not make a quality judgment. Generally, the PMs made positive comments relative to staff support received. However, a number of PMs expressed their concern that staff support was often reactive rather than proactive and they were always wondering (sic) if all issues had been identified and appropriate actions taken.

**Table 4-2. ENVIRONMENTAL SUPPORT STAFF**Programs Reporting Availability of Environmental Support Staff

<u>Service</u>	<u>YES</u>	<u>NO</u>
U.S. Army	34	12
U.S. Air Force	25	1
U.S. Navy	25	8
U.S. Marine Corps	3	0
Joint Programs	9	0
<b>TOTAL</b>	<b>96</b>	<b>21</b>

Approximately half (19) of the PMs interviewed indicated that their PMOs had interfaced with or made use of environmental support staffs or organizations external to their parent command. Nine assessed the support from these sources as "Excellent", nine as "Adequate" and only one considered the support provided as "Inadequate."

PMO Procedures and Processes

Assessing the integration of environmental concerns into the daily procedures and processes of the PMOs was a major focus of the project. While risks and potential liabilities associated with environmental issues are in the media daily, it was interesting that only 74 of 116 reporting programs indicated that environmental concerns were factored into their risk management process. Results by Service are shown in Table 4-3.

The assumptions were made that programs with established EMT/Gs and/or programs that had Programmatic Environmental Analysis (PEA) processes in being were more likely to consider environmental concerns in their risk management processes. These assumptions were tested against the data and results are shown in Table 4-4. Programs with either an EMT/G or PEA are four times as likely to consider environmental issues in risk management. For those programs with both EMT/Gs and a PEA, it is an exception where environmental risk is not considered.

**Table 4-3. RISK MANAGEMENT PROCESS**Programs Reporting Integration of Environmental Concerns

<u>Service</u>	<u>YES</u>	<u>NO</u>
U.S. Army	31	15
U.S. Air Force	18	8
U.S. Navy	18	14
U.S. Marine Corps	1	2
Joint Programs	6	3
<b>TOTAL</b>	<b>74</b>	<b>42</b>

**Table 4-4. PMO ORGANIZATION AND RISK MANAGEMENT**

<u>Programs Reporting Integration of Environmental Concerns</u>		
	<u>YES</u>	<u>NO</u>
Programs with EMT/G	34	9
Programs without EMT/G	40	35
-----		
Programs with PEA	41	11
Programs without PEA	33	33
-----		
Programs with both EMT/G and PEA	24	2

The President's Commission on Environmental Quality established the Quality Environmental Management (QEM) Subcommittee to demonstrate the viability of Total Quality Management (TQM) as a method for achieving pollution prevention. Twelve demonstration projects were undertaken by eleven major corporations. At the conclusion of the projects, each corporation believed the TQM approach to offer a worthwhile and cost effective framework for identifying pollution prevention opportunities.<sup>4</sup> Recognizing these demonstration projects as somewhat parallel efforts to the management tasks of PMOs, an attempt was made to identify use of "Environmental Quality Management" tools by the PMOs. While there could have been a definition and/or understanding problem with this question<sup>5</sup>, only eight PMOs out of 113 responding indicated the use of such tools. Even for those eight reporting use of Environmental Quality Management tools, the tools identified were limited to team approaches, standard reporting systems and templates. No mention was made of statistical process control, charting techniques, analysis techniques or other widely known TQM tool methodologies.

Interview data (40 PMs) revealed that in the course of developing and managing the environmental aspects of their programs, only seven PMs reported any interface, discussion or disclosure activities with the general public. As more than double (16) of these same PMs stated their involvement in developing Environmental Impact Statements (EIS) where public

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<sup>4</sup>Report, Total Quality Management, A Framework for Pollution Prevention, QEM Subcommittee, President's Commission on Environmental Quality, January 1993.

<sup>5</sup>Annex C, Research Project Questionnaire, Environmental Practice in Program Management Offices, Question #39.

involvement is a requisite element of the scoping process,<sup>6</sup> it would appear this process is not as robust as it might be.

All PMs interviewed stated environmental issues were addressed and discussed during their program reviews. Fully half reported this to be a frequent occurrence with the remainder reporting environmental issues on the program review agenda on an intermittent, as required, basis.

Question 35 on the interview<sup>7</sup> required the PM to make a candid self-assessment as to the adequacy of their office's procedures and processes for assuring environmental compliance. Thirty-three PMs believed their programs were complying in at least an adequate fashion, with 14 reporting strong agreement. However, seven PMs were neutral or negative in their assessments. See Figure 4-1.

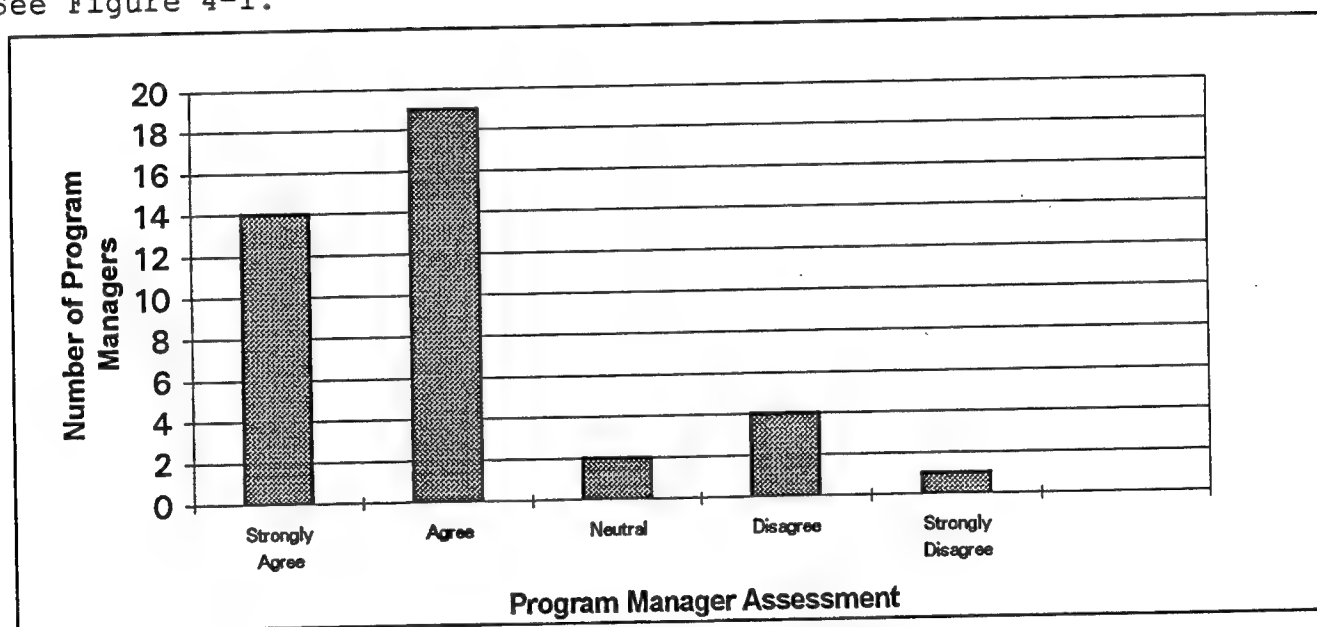


Figure 4-1. ENVIRONMENTAL COMPLIANCE  
(Procedures/Processes are Adequate)

## OBSERVATIONS

### Environmental Management Teams/Groups

The extent of use of the EMT/G approach is somewhat disappointing. While PMs who had EMT/Gs were universal in their

<sup>6</sup>40 CFR 1501.7, (a), (1).

<sup>7</sup>Annex D, Interview Outline.

commendation of those organizations, they were definitely in the minority. It is significant (100% correlation) that all PMs with EMT/Gs reported a positive assessment of their program's environmental procedures and processes. None of the seven PMs, who assessed their offices' procedures and processes as neutral or negative, had established EMT/Gs. The PMs with EMT/Gs, while using the mechanism in varied ways, were all most positive as to the value of this management approach.

#### Environmental Support Staff

The majority of PMOs had environmental support staff available to them and, for the most part, were pleased with the level and quality of support provided. The PMs were also generally pleased with the quality of support they received from staff elements external to their own commands.

#### PMO Procedures and Processes

It was surprising to note that 42 PMOs reported the non-integration of environmental concerns into their risk management processes. It would appear that nothing would be lost by including environmental concerns in the process and to do otherwise could lead to less than optimal decisions. The PMOs that demonstrate environmental awareness by establishment of EMT/Gs and/or use of a PEA process, routinely consider environmental issues in their risk management process. While no specific benefits data were gathered, this would seem to be a prudent approach.

The acquisition community, at least as represented by PMOs, does not appear to have developed or adopted a practice of using Environmental Quality Management tools. The use of such tools is generally viewed as useful in industry and could be readily adapted to PMOs. The Global Environmental Management Initiative (GEMI) has explored this topic and documented its findings.<sup>8</sup> The PMOs, especially those managing large and complex programs, could use environmental quality tools to assist with management of environmental requirements and concerns.

The PMs who appear less than comfortable with the environmental procedures and processes associated with their programs are among the group who have not established EMT/Gs nor have they instituted a Programmatic Environmental Analysis process.

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<sup>8</sup>Total Quality Environmental Management, The Primer, Global Environmental Management Initiative (GEMI), 1993.



## RECOMMENDATIONS

### Environmental Management Teams/Groups

Establishment of internal points of contact and responsible staff action officers for environmental issues is a key element in developing robust environmental procedures and processes. The PMOs should make use of the Environmental Management Team/Group concept to assist in accomplishing environmental requirements. EMT/Gs should include appropriate external agencies and organizations in their membership.

### Environmental Support Staff

Environmental support staffs need to become more proactive in their communication with PMOs.

### PMO Procedures and Processes

The PMOs that have not already done so, should establish EMT/Gs, enhance communications with supporting environmental staff and establish "formal" Programmatic Environmental Analysis (PEA) processes within their programs. These actions should lead to incorporation of environmental concerns into risk management practices, decision making, program review and everyday integrated program management.

## ENVIRONMENTAL REFERENCE MATERIALS

Program offices were surveyed and interviewed as to the extent of environmental reference materials they had on hand. The survey queried as to the availability of specific references including Department of Defense Directives, Service Regulations and other key documents. A listing of the documents reviewed is at Table 5-1. In both the survey and the interview, program offices were questioned as to their use of environmentally oriented software packages to include identification of any packages used.

**Table 5-1. ENVIRONMENTAL REFERENCE DOCUMENTS**

- |   |
|---|
| 1 - AR 200-2, "Environmental Quality: Effects of Army Actions."   |
| 2 - AFR 19-2, "Environmental Planning, Environmental Impact Analysis Process."  |
| 3 - SECNAVINST 5090.6, "Evaluation of Environmental Effects from Department of the Navy Actions."                         |
| 4 - OPNAVINST 5090.1A, "Environmental and Natural Resources Protection Manual."   |
| 5 - National Aerospace Standard 411, "Hazardous Materials Management Program."  |
| 6 - DODD 4210.15, "Hazardous Material Pollution Prevention."  |
| 7 - DODD 6050.1, "Environmental Effects in the United States of DoD Actions."   |
| 8 - DODI 5000.2, Part 6, Section I, "System Safety, Health Hazards and Environment."                                      |
| 9 - DoD 5000.2M, Part 4, Section F, "Integrated Program Summary, Annex E."  |
| 10 - 40 CFR 1500-1508, "Regulations for Implementing the Procedural Provisions of the National Environmental Policy Act." |
| 11 - OTHER KEY DOCUMENTS (Note: Program offices were to insert the titles of other reference documents on hand).          |

## RESULTS

One or more of the environmental reference documents were reported as being on hand in all but seven of the 118 program offices surveyed (Table 5-2). The median size of the typical program office's environmental collection was three documents. Generally, the existence and size of these collections were consistent across the Services. The one noted exception was in

the case of the nine Joint Programs surveyed where five offices reported six or more references on hand.

**Table 5-2. ENVIRONMENTAL REFERENCES ON HAND**

<u>Number of References</u>	<u>Program Offices by Service</u>					<u>TOTAL</u>
	<u>USA</u>	<u>USAF</u>	<u>USN</u>	<u>USMC</u>	<u>Joint</u>	
>10	1	1	2			4
10		1			1	2
9		1	1			2
8	3				2	5
7	1	1				2
6	6	3	4		2	15
5	7	2	4			13
4	4	4	4	2	1	15
3	12	7	2		1	22
2	8	1	11		1	21
1	3	4	3			10
0	2	1	2	1	1	7
						<u>118</u>

An attempt was made to correlate the availability of reference material with program office assessment as to adequacy of guidance. Table 5-3 reflects a limited positive tendency between availability of references and agreement as to adequacy of guidance. Note the bi-modal distribution of respondents, relative to the guidance question, when assessing program offices reporting an extensive (seven or more documents) reference collection.

Of particular interest was the availability of National Aerospace Standard (NAS) 411, "Hazardous Materials Management Program." This standard has received much attention in the past year and has been cited by Department of Defense officials as a model or guide for adoption by the Services. Only 25 of the 118 reporting program offices stated that NAS 411 was on hand in their offices. Table 5-4 shows the distribution of the standard.

**Table 5-3. AVAILABILITY OF REFERENCES COMPARED TO PERCEPTIONS OF ADEQUACY OF ENVIRONMENTAL GUIDANCE**

<u>Documents on Hand</u>	<u>Perception that Guidance is Adequate</u>				
	<u>Strongly Agree</u>	<u>Agree</u>	<u>Neutral</u>	<u>Disagree</u>	<u>Strongly Disagree</u>
Four or More (58)	10	31	8	8	1
Three or Fewer (60)	5	28	20	6	1
Seven or More (15)	4	7	0	3	1

**Table 5-4. AVAILABILITY OF NATIONAL AEROSPACE STANDARD 411 "HAZARDOUS MATERIALS MANAGEMENT PROGRAM"**

<u>Copy of Standard is On Hand</u>		
<u>Service</u>	<u>Yes</u>	<u>No</u>
U.S. Army	7	40
U.S. Air Force	12	14
U.S. Navy	2	31
U.S. Marine Corps	0	3
Joint Programs	4	5
TOTAL	25	93

The use of environmentally oriented software applications for performance support was addressed in both surveys and interviews. The use of such packages may be described as minimal. In large part, this may be attributed to the relative scarcity of appropriate programs and lack of dissemination of information where programs do exist.

In response to survey question number 19 (Do you make use of any environmental management software to assist in planning?), only eight program offices responded in the affirmative. Table 5-5 lists the software programs cited. During the interview process, program managers were queried as to the use of environmentally oriented software programs in their offices. Ten (out of 40) PMs identified one or more software tools being used to manage environmental issues. Table 5-6 lists the programs identified during interviews.

**Table 5-5. ENVIRONMENTAL MANAGEMENT SOFTWARE**  
(Survey Responses)

- Life Cycle Cost Estimator (HSC/EM)
- Aeronautical Systems Center, Funding Estimator for Weapon System Pollution Prevention
- Air Force Materiel Command, List of Military Standards, Regulations and Ozone Depleting Chemicals (ODCs)
- DMS, Data Management System (Provides information on hazardous materials)
- GOLD, Government On-Line Data System (Tracks hazardous material)
- HMIS, Hazardous Materials Information System
- Various self-generated databases

**Table 5-6. ENVIRONMENTALLY ORIENTED SOFTWARE PROGRAMS**  
(Interview Responses)

- Database for Technical Orders and Military Specifications
- Technology Need Summaries
- CD-ROM on Material Safety Data Sheets (MSDS)
- On-line regulatory requirements to include environmental requirements
- Navy Clearinghouse on Ozone Depleting Substances (ODS)
- HAZMAT Database
- Hazardous Material Information System (HMIS)
- Contractor developed database on Class I Ozone Depleting Chemicals
- Database on German environmental requirements
- Various self-generated databases

#### OBSERVATIONS

Reference collections of environmental guidance publications are limited at the program office level.

Program offices with larger environmental reference collections appear to be only slightly more comfortable as to the adequacy of environmental guidance.

National Aerospace Standard 411, "Hazardous Materials Management Program" is not widely distributed or known to the program management community.

Use of environmentally oriented software application programs is minimal. What programs do exist are primarily databases associated with either hazardous materials or some body of regulatory requirements.

## RECOMMENDATIONS

Dissemination of environmental information should be improved. Electronic media should be extensively employed in this effort.

Efforts to develop environmentally oriented software planning tools, to include life cycle cost estimation, should be enhanced.

## ENVIRONMENTAL DOCUMENTATION PROCESSES

In addition to planning, funding and executing sound environmental practices relative to his/her program, a Program Manager (PM) needs to document these actions in accordance with several regulatory requirements. Recognizing this documentation workload, several aspects of this process were examined in both the survey and interview phases of the project. Documentation areas investigated included the Programmatic Environmental Analysis (PEA), National Environmental Policy Act (NEPA) requirements, the Integrated Program Summary (IPS) Environmental Annex and program office scheduling practices.

### RESULTS

#### Programmatic Environmental Analysis (PEA)

The PEA is to be initiated immediately after Milestone I, Concept Demonstration Approval.<sup>1</sup> This analysis process, and its associated documentation, is to follow from the "Initial Environmental Analysis and Planning" which was carried out in Phase 0, Concept Exploration and Definition. The analysis is updated as the program progresses, the documentation is updated, or "tiered", prior to each succeeding decision point and will be summarized in the Integrated Program Summary (IPS) prepared for the program. Each program surveyed was asked if a PEA had been initiated. Only 52 of the 114 program offices replying to this question answered in the affirmative. Table 6-1 shows compliance with the PEA requirement by Service. It must be recognized that

**Table 6-1. PROGRAMMATIC ENVIRONMENTAL ANALYSIS (PEA)**

<u>Programs Reporting PEA Had Been Initiated</u>		
<u>Service</u>	<u>YES</u>	<u>NO</u>
U.S. Army	21	24
U.S. Air Force	13	13
U.S. Navy	12	19
U.S. Marine Corps	0	3
Joint Programs	6	3
TOTAL	52	62

several of the programs responding to the survey were already mature with respect to the acquisition process (Phase III or later) and may well have been in existence long before the PEA

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<sup>1</sup>DODD 5000.2, Part 6, Section I, Para. 3.d.(2).

requirement was established. Table 6-2 reflects that 46 of the 62 programs replying in the negative, relative to the PEA requirement, were in Phase III, Production and Deployment, or later in the acquisition life cycle. Programs reporting themselves as being simultaneously engaged in several phases were, for the most part, either mature major weapon systems with variants or major modification programs in the earlier phases; or "Basket" PMs who had a variety of smaller individual programs spread across the phase spectrum.

**Table 6-2. PEA STATUS BY PHASE**

<u>Acquisition Phase</u>	<u>Programs With PEA</u>	<u>Programs Without PEA</u>
Phase 0, Concept		
Exploration & Definition	3	0
Phase I, Demonstration & Validation	2	5
Phase II, Engineering & Manufacturing Development	13	11
Phase III, Production & Deployment	11	21
Phase IV, Operations & Support	2	5
Multi-Phases <sup>2</sup>	21	20
<b>TOTAL</b>	<b>52</b>	<b>62</b>

A number of distinguishing characteristics of the reporting programs were reviewed to identify causality or other relationship impacting on compliance with the PEA requirement. Size (manning) of the program office, the existence of an Environmental Management Team/Group (EMT/G), the existence of a supporting environmental staff and the acquisition category (ACAT) of the programs were all reviewed. These results are shown in Tables 6-3 through 6-6.

**Table 6-3. PEA STATUS BY SIZE OF PROGRAM OFFICE**

<u>Size of Office</u>	<u>Programs With PEA</u>	<u>Programs Without PEA</u>
Less than 10 Personnel	4	9
11 to 25 Personnel	9	20
26 to 50 Personnel	18	13
51 to 100 Personnel	10	8
More than 100 Personnel	11	12
<b>TOTAL</b>	<b>52</b>	<b>62</b>

<sup>2</sup>NOTE: These were either major programs with variants or modifications in two or more phases; or "Basket" Program Offices with smaller individual programs in varying phases.



**Table 6-4. PEA STATUS RELATIONSHIP TO ENVIRONMENTAL MANAGEMENT  
TEAMS/GROUPS(EMT/G)**

<u>Program Office Organization</u>	<u>Programs With PEA</u>	<u>Programs Without PEA</u>
EMT/G Established	26	14
EMT/G Not Established	26	48

**Table 6-5. PEA STATUS RELATIONSHIP TO ENVIRONMENTAL STAFF SUPPORT**

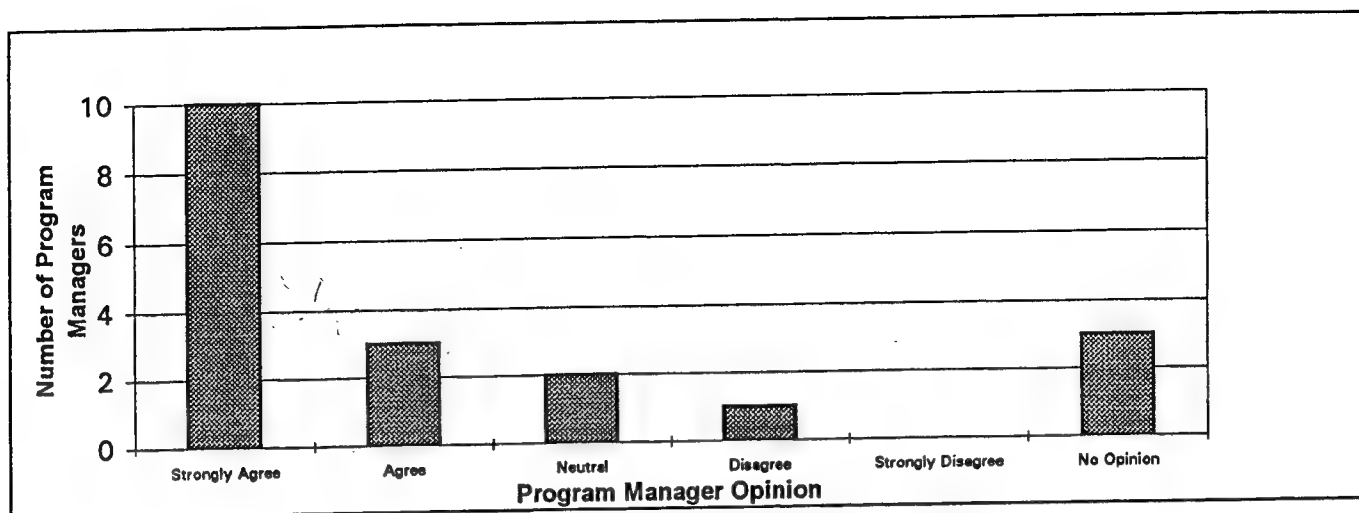
<u>Program Office Support</u>	<u>Programs With PEA</u>	<u>Programs Without PEA</u>
Staff is Available	46	47
Staff is Not Available	6	15

**Table 6-6. PEA STATUS BY ACQUISITION CATEGORY (ACAT)**

<u>ACAT</u>	<u>Programs With PEA</u>	<u>Programs Without PEA</u>
I D	19	12
I C	12	11
II	3	10
III	9	9
IV	1	8
Multi-ACAT <sup>3</sup>	8	11
No ACAT Specified	0	1
<b>TOTAL</b>	<b>52</b>	<b>62</b>

The existence of a PEA was also posed as a question during the interview phase of the project. Of the 40 PMs interviewed, 19 reported the existence of PEA processes and documents for their programs. This degree of compliance is roughly the same as was determined in the survey process. The nineteen PMs with PEAs were asked for their candid assessment as to the organization, completeness, robustness and candidness of their PEAs. These responses, which were largely positive, are shown in Figure 6-1.

<sup>3</sup>Program offices reporting variants or modification programs in differing ACATs; or "Basket" Program offices with smaller individual programs in differing ACATs.



**Figure 6-1. PROGRAM MANAGER RESPONSES**  
(PEA-organized, complete, robust, candid)

### National Environmental Policy Act

The National Environmental Policy Act (NEPA) of 1969, as amended,<sup>4</sup> and the Council of Environmental Quality Regulations for implementing procedural provisions of the National Environmental Policy Act,<sup>5</sup> in part, establish dissemination and reporting requirements for environmental information pertaining to the decision processes of Federal Agencies. They are applicable to all Federal Agencies except where compliance is inconsistent with other statutory requirements. The NEPA requirements and the environmental process/reporting requirements of DODD 5000.2 must be integrated and applied at appropriate points in the acquisition decision making process. Determining the applicability of NEPA requirements can be a difficult task.

Fifty-seven program offices reported they had been required to produce NEPA documentation at some point in the life cycle of their program. Conversely, 61 offices reported no NEPA activity. NEPA requirements have apparently weighed heaviest on Joint Programs (8 of 9), U.S. Army (25 of 46) and U.S. Air Force (13 of 26) programs. The U.S. Navy and U.S. Marine Corps have not experienced the same degree of impact with only 11 of 36 program offices reporting as having created NEPA documentation. Requirements were roughly equally spread with regard to acquisition categories (ACATs). See Figure 6-2.

<sup>4</sup>Public Law 91-190, 42 USC 4321-4347, January 1, 1970 as amended by Public Law 94-52, July 3, 1975 and Public Law 94-83, August 9, 1975.

<sup>5</sup>40 CFR Parts 1500-1508.

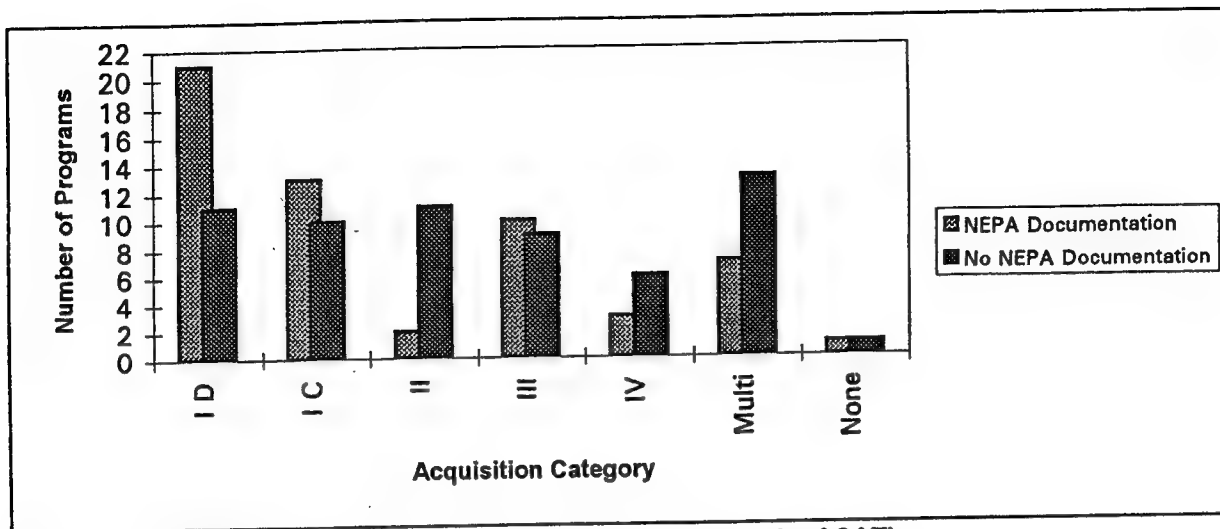


Figure 6-2. NEPA DOCUMENTATION (Programs by ACAT)

While only a limited sample (forty interviews) was developed, it did indicate the NEPA documentation workload was evenly distributed between Environmental Assessments and Environmental Impact Statements. Twenty-five of the 40 PMs interviewed reported their program offices as having been involved in the creation of NEPA documents. The PMs who were able to make definitive statements (13) as to the quality of these efforts, almost universally (one dissenter) categorized them as very well done. In only one case was a situation uncovered where an Environmental Impact Statement (EIS) was reported as having been completed prior to the Critical Design Review (CDR) for the program. This situation involved the installation of a technical facility (construction) and had received environmental scrutiny from State and local agencies. On the other hand, in discussing the timing of EISs, a number of PMs expressed the opinion that not enough was known about manufacturing, maintenance or deployment at time of CDR to support a realistic EIS.

Program office staffs, supporting component staffs, contractors and other outside agencies were all identified as authors of NEPA documents. The spread of responsibility (authorship) is as shown at Table 6-7.

**Table 6-7. NEPA DOCUMENT "AUTHORS"**

<u>Service</u>	<u>PMO</u>	<u>COM</u>	<u>CON</u>	<u>OTH</u>
U.S. Army	7	11	5	2
U.S. Air Force	4	5	5	
U.S. Navy	4	6		
U.S. Marine Corps				
Joint Programs	3	4	1	
<b>TOTAL</b>	<b>18</b>	<b>26</b>	<b>11</b>	<b>2</b>

Note: PMO - Program Management Office Staff  
COM - Component Staff Agency  
CON - Contractor  
OTH - Other

### Environmental Analysis, Annex E

The Integrated Program Summary (IPS), with its Annexes, is the primary decision document used to facilitate top-level acquisition milestone decision making. The IPS documentation process is prescribed for all acquisition categories with streamlining and tailoring to be applied for ACAT II, III and IV programs.<sup>6</sup> Annex E, "Environmental Analysis," describes the methodology and procedures used to analyze potential environmental impacts and integrates that information into the program management and acquisition processes.<sup>7</sup>

For the programs responding, 68 out of 116 program offices reported an Annex E had been prepared at some point for their program. Distribution of programs by Service is at Table 6-8. Table 6-9 reflects a breakout by phase of acquisition process for those programs with Environmental Analysis Annexes.

**Table 6-8. ENVIRONMENTAL ANALYSIS, ANNEX E**  
Programs Reporting Existence of Annex E

<u>Service</u>	<u>YES</u>	<u>NO</u>
U.S. Army	33	13
U.S. Air Force	7	18
U.S. Navy	19	14
U.S. Marine Corps	1	2
Joint Programs	8	1
<b>TOTAL</b>	<b>68</b>	<b>48</b>

<sup>6</sup>DoD 5000.2-M, Part 4, Para. 2.

<sup>7</sup>DOD 5000.2-M, Part 4, Section F.

**Table 6-9. ANNEX E STATUS BY PHASE**

<u>Acquisition Phase</u>	<u>Number of Programs</u>	
	<u>With Annex E</u>	<u>Without Annex E</u>
Phase 0, Concept		
Exploration & Definition	3	0
Phase I, Demonstration & Validation	4	3
Phase II, Engineering & Manufacturing Development	18	5
Phase III, Production & Deployment	16	17
Phase IV, Operations & Support	0	7
Multi-Phases <sup>8</sup>	26	0
No Phase Reported	1	0
<b>TOTAL</b>	<b>68</b>	<b>48</b>

Various characteristics of the reporting programs were reviewed with respect to their potential impact on the question of whether or not an Environmental Analysis, Annex E, had been prepared. Establishment of EMT/Gs, availability of environmental staffs and the existence of a PEA were reviewed. These results are shown in Tables 6-10 through 6-12.

**Table 6-10. ANNEX E STATUS RELATIONSHIP TO ENVIRONMENTAL MANAGEMENT TEAMS/GROUPS(EMT/EMG)**

<u>Program Office Organization</u>	<u>Programs With Annex E</u>	<u>Programs Without Annex E</u>
EMT/G Established	21	22
EMT/G Not Established	47	28

**Table 6-11. ANNEX E STATUS RELATIONSHIP TO ENVIRONMENTAL STAFF SUPPORT**

<u>Program Office Support</u>	<u>Programs With Annex E</u>	<u>Programs Without Annex E</u>
Staff is Available	57	39
Staff is Not Available	11	11

<sup>8</sup>NOTE: These were either major programs with variants or modifications in two or more phases; or "Basket" Program Offices with smaller individual programs in varying phases.

**Table 6-12. ANNEX E STATUS RELATIONSHIP TO PROGRAMMATIC ENVIRONMENTAL ANALYSIS (PEA)**

<u>PEA Status</u>	<u>Programs With Annex E</u>	<u>Programs Without Annex E</u>
PEA Established	37	15
PEA Not Established	31	35

The "authorship" of the Annex E's was investigated as had been the "authorship" of NEPA documents reviewed above. Responsible authors were identified as shown in Table 6-13. Of the 68 program offices reporting an Annex E in being, over half of these annexes were authored by program office staff.

Quality, in terms of clear description of environmental consequences to support the decision making process (Question 28 on the Interview), was assessed as positive by 17 out of 18 PMs. One PM opined that his program's Annex E only partially addressed the relevant issues. Thirteen PMs, of this group of 18, stated that mitigation measures had been outlined in their Annex E, while in five cases mitigation was not required.

**Table 6-13. ANNEX E DOCUMENT "AUTHORS"**

<u>Service</u>	<u>PMO</u>	<u>COM</u>	<u>CON</u>	<u>OTH</u>
U.S. Army	17	11	4	1
U.S. Air Force	5	1	1	
U.S. Navy	12	4	3	
U.S. Marine Corps		1		
Joint Programs	4	4		
TOTAL	<u>38</u>	<u>21</u>	<u>8</u>	<u>1</u>
Note: PMO - Program Management Office Staff COM - Component Staff Agency CON - Contractor OTH - Other				

### Master Schedule

Scheduling practices of program offices were not investigated to any great extent. However, program offices were asked if environmental events were recorded and tracked on the program master schedule. Forty-four of 116 offices responding replied in the affirmative.

## OBSERVATIONS

### Programmatic Environmental Analysis (PEA)

While there are logical and plausible explanations for the lack of implementation of the PEA process in several program offices, there are a significant number of instances where implementation should have been made, but was lacking. Tables 6-2 and 6-6 indicate a significant number of programs of either appropriate phase or significant size to justify immediate implementation of the PEA process.

Table 6-3 indicates there is a 50% greater chance of a program not having implemented the PEA for offices of 25 or fewer personnel. There is also a significant number (33) of larger offices who do not have an on-going PEA process.

For the most part, it is the larger program offices that may be expected to have an EMT/G established. Thirty-three of the 40 offices reporting teams/groups in existence were of the larger office sizes (more than 26 personnel authorized). Consequently, the relationship between the lack of a team/group and the lack of a PEA, as shown in Table 6-4, is consistent with the impact of office size as previously discussed.

Table 6-5 reflects an even division on the PEA issue for program offices that have an Environmental Staff available to them. If Staff is not available, programs are more than twice as likely to not have implemented the PEA process.

Table 6-6 is disturbing in that it depicts a significant number; e.g., 23 ACAT Is, of large programs that are without benefit of PEA.

For programs that have accomplished PEAs, the responsible PMs are in general agreement that the process was executed in a thorough and professional manner (Figure 6-1).

### National Environmental Policy Act

Whether or not a program has been involved in the NEPA documentation process appears somewhat arbitrary. While one may expect larger programs (ACAT I & II) to be more involved with NEPA documentation than smaller programs, that apparently is only marginally true (Figure 6-2). Parent Service policy and guidance seems to have influence on programs as to their degree of NEPA process participation.

When program offices did undertake to create NEPA documents, they did a responsible and relatively thorough effort.

The use of supporting component staff agencies was the most prevalent means used to accomplish NEPA documentation. However, both program office staffs and contractors were also often used to meet NEPA requirements (Table 6-7).

### Environmental Analysis, Annex E

The Service distribution of programs (Table 6-8) reporting existence of Annex E was puzzling in the case of the U.S. Air Force program responses. Only about a third of the U.S. Air Force programs reported having Annex E's. When this is compared to the response dealing with NEPA documentation, we find more U.S. Air Force programs reporting NEPA document accomplishment (13 programs) than we find for Annex E (7 programs). This anomaly may spring from some misunderstanding of the questionnaire; because of maturity of the programs involved in the survey or some other contextual problem not identified.

Of similar curiosity are the acquisition phase responses shown in Table 6-9. It does not seem logical that programs would have Annex E's in Phase 0 of the acquisition process, yet three programs reported their existence. Perhaps these three were "safe sided" responses. Several (24) older programs did not have Annex E's as for many of them the requirement had not existed when they passed through the applicable milestones.

Tables 6-10 through 6-12 portray some interesting information relative to various aspects of program office environmental practices and how they possibly influence Annex E development. A positive influence on the creation of Annex E's appears to be the availability of supporting environmental staff. This may occur because of that staffs creating and enforcing organizational policy relative to Annex E, staff assistance in producing Annex E's or some other factor not indicated by the research. If a program office had established a PEA process it was very likely (better than 2 to 1) to have produced an Annex E. The integration of environmental management into everyday program management process is essential if program office cultural change is to be achieved. This integration is key to moving from a compliance standard to one of excellence.<sup>9</sup>

Program offices have taken a strong lead in authoring the Annex E's (Table 6-13). A marked increase is apparent in this area when contrasted to NEPA authorship (Table 6-7). This may, in

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<sup>9</sup>"Moving from Managing for Environmental Compliance to Managing for Prevention and Environmental Excellence," Corporate Quality-Environmental Management III: Leadership-Vision to Reality Conference Proceedings, Global Environmental Management Initiative (GEMI), March 24-25 1993, page 138.



part, be attributable to greater familiarity of program office personnel with the DoD 5000 series documents and associated requirements as opposed to governing NEPA rules.

Where Annex E's had been developed, PMs were extremely positive as to the quality of the documents.

#### Master Schedule

Fewer than half (38%) of program offices reported tracking environmental events on their program master schedules. This is a fewer number of programs than those reporting environmental activities of a level of significance as to warrant NEPA involvement. It would appear that additional program offices could benefit from more active tracking and monitoring of environmental events.

### RECOMMENDATIONS

#### Programmatic Environmental Analysis (PEA)

Management initiatives should be taken by both the Office of the Secretary of Defense and the responsible Service Headquarters to assure the initiation of the PEA process for all programs in the early phases of the acquisition cycle. Similar attention should be paid to all large programs, particularly those possessing potential for adverse environmental impact, regardless of acquisition phase.

Environmental Performance should be added as a Program Performance and System Indicator to the Assessments Section of the Defense Acquisition Executive Summary (DAES) Report for ACAT I programs.<sup>10</sup>

#### National Environmental Policy Act

Participation in NEPA processes should not be arbitrary. Every program, beginning with their initial environmental analysis and planning effort, should implement the NEPA process. If full NEPA processes are not required as time goes on and the program develops, a "Categorical Exclusion" or "Finding of No Significant Impact" may be used to conclude NEPA activity.

#### Environmental Analysis, Annex E

The tie between environmental practices and processes such as PEA and the resulting products to include documents (e.g.,

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<sup>10</sup>DoD 5000.2-M, Part 16, Section C, Preparation Instructions, Para. 2.

Annex E), decisions and actions needs to be emphasized. The overall process is a continuum and must be integrated into program management and acquisition processes. This rationale applies for NEPA actions as well as environmental actions specified in the DoD 5000 series documents.

#### Master Schedule

Program offices should routinely identify and track, on the master schedule, environmental events of programmatic significance.

## ENVIRONMENTAL FUNDING

Funding for environmental requirements within the Department of Defense is an evolving process and is managed in both centralized and decentralized modes. Examples of centralized funding accounts at the Department of Defense (DoD) include the several programs funded under what is labeled as Environmental Security Programs. Funds for compliance, pollution prevention and technology (all of which are of interest to the acquisition community) are included in these accounts. In addition, but to limited degree, funds are budgeted by acquisition commands and program management offices (PMOs) for specific environmental requirements related to acquisition. Focus of this research was limited to those funding actions and activities which impacted PMOs.

### RESULTS

The processes used to determine environmental funding needs were not viewed favorably by program offices. Ninety-two program offices provided neutral or negative responses as to the adequacy of environmental funding processes. Only 25 offices responded favorably to this question of adequacy. The results are shown in Figure 7-1. Responses were equally distributed across the Services.

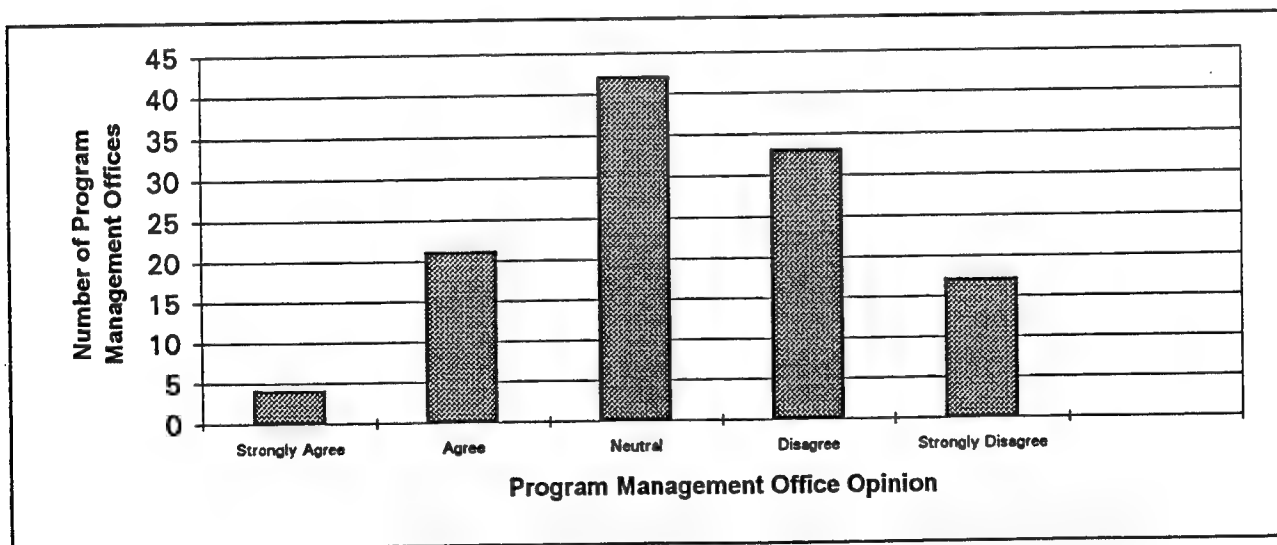


Figure 7-1. FUNDING PROCESS (PMO Opinion as to Adequacy of Process)

Of the 40 Program Managers (PMs) interviewed, only 13 of them indicated that environmental costs were identified in program funding documents. Again, the parent Service of the programs did not appear to be an influencing factor. With one

exception, involving a particular set of circumstances, PMs with identifiable environmental funding estimated the amounts as ranging from one to five percent of their total program funding. A couple of PMs observed that these costs were growing and were receiving increased attention.

Program offices were queried as to whether or not environmental requirements and costs were addressed in the Cost and Operational Effectiveness Analyses (COEA) for their programs. Responses are depicted in Table 7-1. In similar fashion, the offices were queried as to the inclusion of estimated environmental costs in the Life Cycle Cost Estimates (LCCE) for their programs. Results are in Table 7-2.

**Table 7-1. COST AND OPERATIONAL EFFECTIVENESS ANALYSIS (COEA)**

<u>Environmental Requirements and Costs Included</u>		
<u>Service</u>	<u>YES</u>	<u>NO</u>
U.S. Army	12	31
U.S. Air Force	4	18
U.S. Navy	7	22
U.S. Marine Corps	2	1
Joint Programs	4	5
TOTAL	29	77

**Table 7-2. LIFE CYCLE COST ESTIMATE (LCCE)**

<u>Environmental Costs Included</u>		
<u>Service</u>	<u>YES</u>	<u>NO</u>
U.S. Army	19	27
U.S. Air Force	12	14
U.S. Navy	14	19
U.S. Marine Corps	3	0
Joint Programs	3	6
TOTAL	51	66

During the interview process, 14 PMs averred to the inclusion of environmental costs in the program Logistics Support Analyses (LSA). Conversely, 19 managers stated environmental costs had not been included in the LSA.

#### OBSERVATIONS

Funding and/or cost issues appear to be dealt with on a random basis as far as program funding documentation, COEAs, LCCEs and LSAs are concerned. There was no discernable pattern observed as to affect of parent Service, Acquisition Category, acquisition phase, presence or absence of Environmental Management Teams/Groups (EMT/Gs) or Environmental Staff. This apparent randomness may be related to the pervasive level of discomfiture expressed relative to adequacy of funding processes (Table 7-1). During the interviews, several PMs expressed frustration with the "continual flow of environmental requirements without the necessary accompanying funding to accomplish them"(sic).

Environmental issues are not explicitly addressed in the COEA portion (Part 4) of DODI 5000.2. However, Life Cycle Cost is addressed as an important concept. Life cycle costs, monetary and non-monetary, are to be considered for each alternative in the COEA. Separate estimates are to be developed for operational and maintenance costs.<sup>1</sup> The section on COEAs in 5000.2-M, in its guidelines for reviewing COEAs, specifically addresses questions of "Have all relevant costs been displayed?"<sup>2</sup> and "Does the analysis present all costs and measures of effectiveness for all alternatives?"<sup>3</sup> It's fair to claim the thrust is to include all costs, including environmental, in these analyses.

The need to identify and include environmental cost issues in the decision making process has been recognized in several forums. To "Improve Federal Decisionmaking Through Environmental Cost Accounting" is environmental objective ENV01 in the "Reinventing Environmental Management" Accompanying Report of the National Performance Review.<sup>4</sup>

Total Cost Assessment, to include Pollution Prevention, has been advocated by both the Environmental Protection Agency<sup>5</sup> and

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<sup>1</sup>DODI 5000.2, Part 4, Page 4-E-4, Para. 3.a.(6).

<sup>2</sup>DoD 5000.2-M, Change 1, Part 8, Page 8-13, Para. 2.d.(6).

<sup>3</sup>DOD 5000.2-M, Change 1, Part 8, Page 8-13, Para. 2.d.(9).

<sup>4</sup>Reinventing Environmental Management, Accompanying Report of the National Performance Review, Office of the Vice President, September 1993.

<sup>5</sup>Report, Total Cost Assessment: Accelerating Industrial Pollution Prevention through Innovative Project Financial Analysis, EPA/741/R-92/002, Environmental Protection Agency, May 1992.

the Global Environmental Management Initiative (GEMI).<sup>6</sup> The DoD, as part of its ongoing efforts to incorporate pollution prevention into acquisition, is seeking to integrate life-cycle environmental costs into Life Cycle Cost Estimates.<sup>7</sup>

Pollution prevention funding is being addressed, on a Service wide basis, by its identification as a separate pillar in the budget submissions of the Services and the Defense Agencies.<sup>8</sup> A total of approximately \$386 million is projected for FY 1995. The dual approach of Service wide and Program specific funding should serve to accelerate progress as long as both efforts are integrated and monitored.

#### RECOMMENDATIONS

The area of environmental funding needs immediate and vigorous attention. While initiatives in this area have been announced, much remains to be accomplished if identification and integration of environmental funding requirements is to be accomplished at the program level.

Following the lead of the DoD Comptroller in establishing pollution prevention as a separate funding line at Service level, the same should be accomplished at Program level. The proper strategy of integration into all program management processes coupled with management attention and visibility of environmental funding needs to be vigorously applied.

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<sup>6</sup>Primer, Finding Cost-Effective Pollution Prevention Initiatives: Incorporating Environmental Costs Into Business Decision Making, Global Environmental Management Initiative, 1994.

<sup>7</sup>Memorandum, "Comprehensive Pollution Prevention Strategy," The Secretary of Defense, 11 August 1994.

<sup>8</sup>Report to the House Armed Services Committee, "Department of Defense Pollution Prevention Initiatives," Department of Defense, September 30, 1994.

## ENVIRONMENTAL CONTRACTING ACTIONS

Recognizing that the bulk of acquisition activity is accomplished through contracting with the Defense Industry sector, a considerable degree of attention was paid to this interface and activity. The project questionnaire included 10, out of a total of 45, questions aimed at contracting and in similar fashion, 10 of the 48 interview questions were related to contracting activities. For ease of discussion, the contracting information and findings have been divided into four segments for presentation. These segments are Program Office Contracting Actions, Contract Requirements and Structure, Contract Performance and Use of Environmental Support Contractors.

### RESULTS

#### Program Office Contracting Actions

This area was explored primarily through the research questionnaire that was sent to program management offices (PMOs). The PMOs were asked if the Military Specifications and Standards called out in their contracts had been screened for environmental impact. Of the 116 offices responding to this query, 85 reported that such screening had been accomplished. Twenty-one offices reported a partial screening of their contracting documents with many citing a focus on Class I Ozone Depleting Substances. Only ten offices reported a total lack of environmental screening. While no particular discerning feature characterized the ten programs reporting no screening, it is of interest that four of these programs were Acquisition Category I D. All but one of these program offices reported that their program had experienced adverse impacts from one or more environmental factors.

The use of incentive or award fees relative to environmental requirements or performance does not appear to be wide spread. Only ten of 118 programs reported the use of these contract mechanisms. While this constitutes a small sample of experience with the use of incentive/award fees, the indication is that such fees are useful. Figure 8-1 shows seven out of ten offices reporting favorable experience with this contract mechanism.

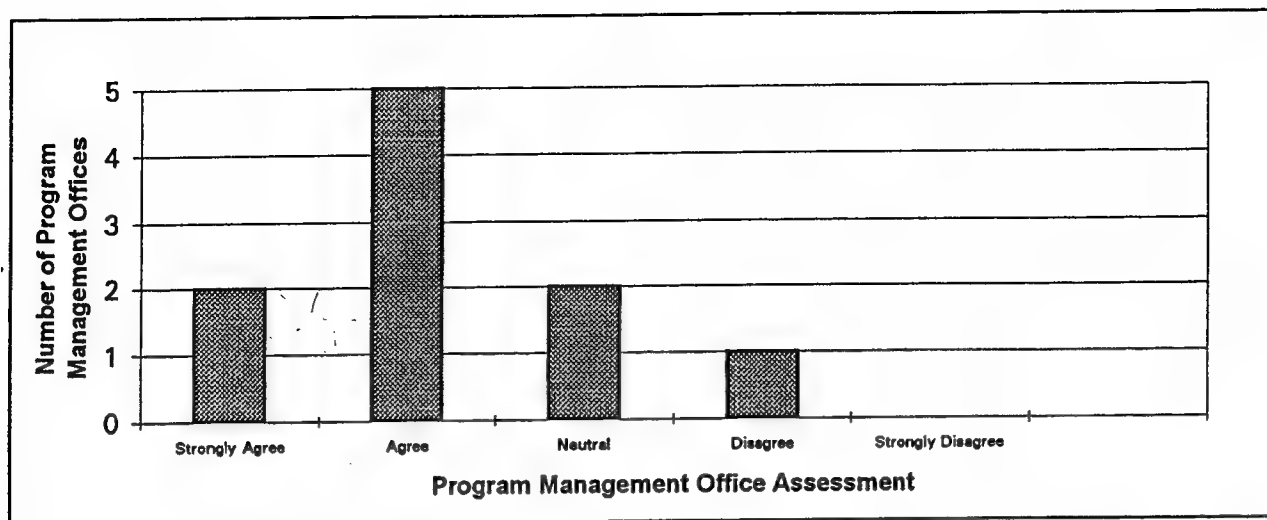
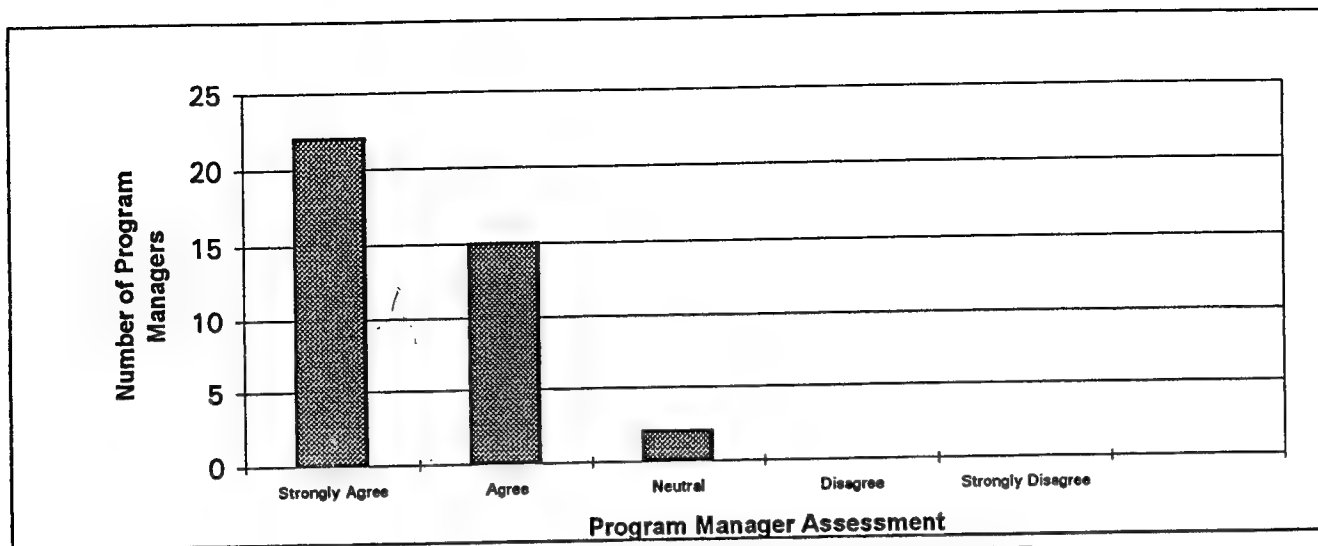


Figure 8-1. INCENTIVE/AWARD FEES (Incentive/Award Fees are Effective)

Also not very wide spread was the consideration of past environmental performance as an evaluation factor in conducting source selections. Only eight PMOs (out of 115 responding) reported the use of an environmental performance evaluation factor. While the eight programs were diverse in terms of Service affiliation and Acquisition Category, all reported having access to environmental staffs and six of the eight had established Environmental Management Teams/Groups (EMT/Gs) within their offices. Furthermore, seven of the eight had active Programmatic Environmental Analysis (PEA) processes in place and seven had prepared an Annex E, Integrated Program Summary Environmental Annex, at some point. The level of environmental consciousness appears to be high in these eight program offices. Four of these programs were among the group of ten that reported use of incentive and/or award fees.

During the interviews, Program Managers (PMs) were asked if they thought their offices did a "responsible job" in specifying environmental compliance requirements in their contract documents and actions. The responses to this self-assessment were overwhelmingly positive. See Figure 8-2.





**Figure 8-2. CONTRACT ACTION PREFORMANCE**  
(Program Office does "Responsible Job")

### Contract Requirements and Structure

The integration of environmental concerns and/or requirements into contractually required program plans was investigated. The three specific plans investigated were the Systems Engineering Management Plan (SEMP), the Manufacturing Management Plan (MMP) and a contractor developed Hazardous Materials Management Program (HMMP) and Plan.

The SEMP, most often, is a required contract deliverable from the weapons systems contractor.<sup>1</sup> Environmental analysis is one of many technical disciplines to be integrated into the systems engineering process and incorporated into the SEMP.<sup>2</sup> The policies and procedures applicable to development of a weapon system design for manufacturing or production include a requirement to "review the design's use of... and hazardous materials...." as part of the procedure for establishing a manufacturing process.<sup>3</sup> PMOs were asked if environmental concerns were identified in the SEMPs and MMPs for their programs. Results are as shown in Table 8-1.

National Aerospace Standard 411 discusses the development and application of a Hazardous Materials Management Program to assure proper consideration to the use and disposal of hazardous

<sup>1</sup>DODI 5000.2, Part 6, Section A, Para. 3.d.(1)(a), Page 6-A-4.

<sup>2</sup>DODI 5000.2, Part 6, Section A, Para. 3.c.(1), Page 6-A-5.

<sup>3</sup>DODI 5000.2, Part 6, Section O, Para. 3.a.(4), Page 6-O-3.

materials throughout all phases of the system life cycle.<sup>4</sup> Fifty-three program offices stated that their contractors had been required to develop Hazardous Materials Management and Waste Plans. These data are also included in Table 8-1.

**Table 8-1. PROGRAM PLANS**

Program Office Response	Environmental Concerns in SEMP	Environmental Concerns in MMP	Contractor Developer HMMWP
YES	58*	63*	53**
NO	46	41	40
Not Applicable	7	9	22
No Response	7	5	3
TOTALS	<u>118</u>	<u>118</u>	<u>118</u>
Notes: * 54 Program Offices reported environmental concerns as being addressed in both SEMP and MMP.			
** 32 Program Offices reported environmental concerns addressed in SEMP and MMP and the requirement for a contractor developed HMMWP.			

Program offices were asked if they believed that costs and liabilities for potential environmental non-compliance or damage were well delineated between the PMO and contractors. Replies to this inquiry were spread in a normal distribution and were essentially the same from all Services. See Figure 8-3.

<sup>4</sup>NAS 411, Hazardous Materials Management Program, July 1993, Para. 1.1.

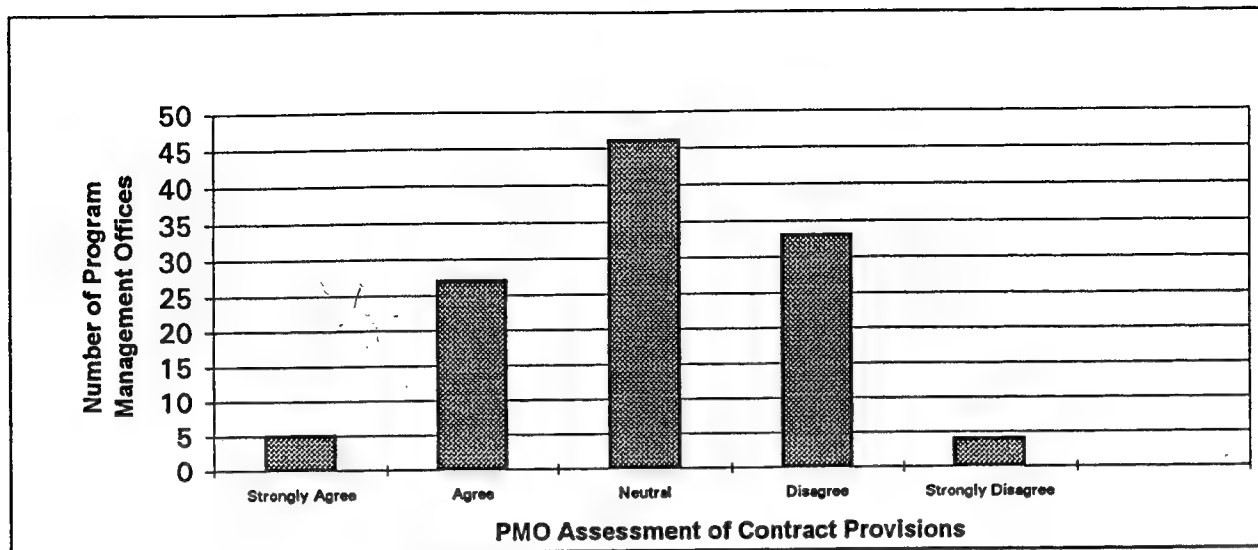


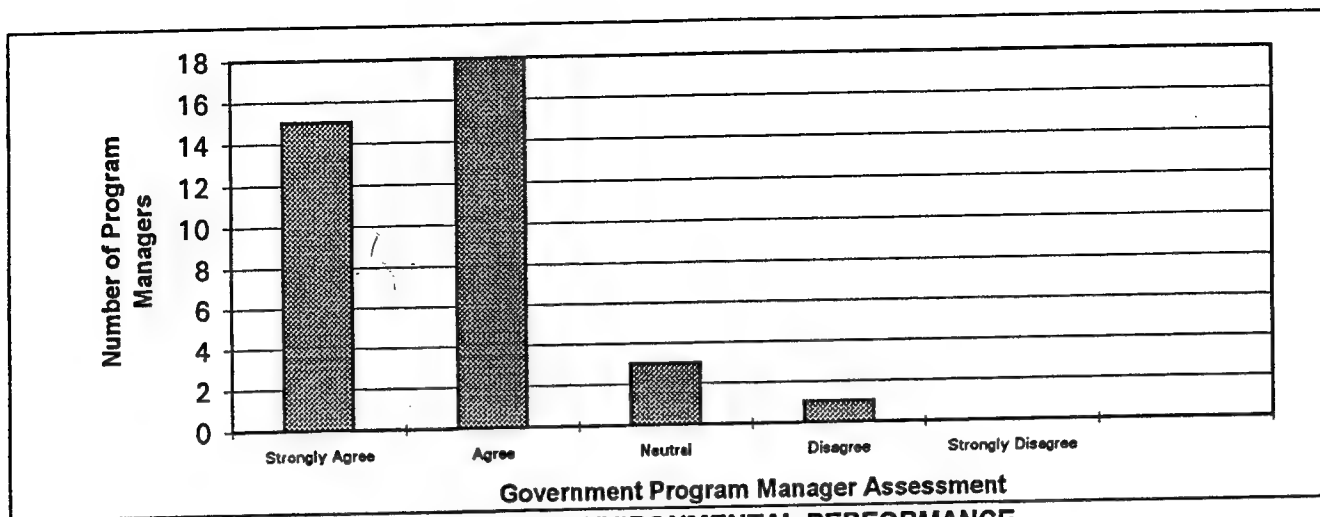
Figure 8-3. PMO ASSESSMENT (Costs and Liabilities are Well Delineated)

As a specific item of inquiry, PMOs were asked if their contractor's overhead rates included environmental clean up costs. Seventy-three offices reported they did not know. Thirty PMOs reported that the overhead rate in their contracts did include such costs, while 13 offices reported the exclusion of such costs. This question was asked again during the interview process with somewhat more positive response in that only 13 out of 36 reported not knowing the structure of the overhead rate, as far as environmental clean up costs were concerned. Sixteen program managers stated such costs were included and seven reported they were not. When questioned further, none of the sixteen program managers who believed environmental clean up costs were in their contractor's overhead rates had a precise fix on the magnitude of these costs. Several expressed their belief that such costs were "small."

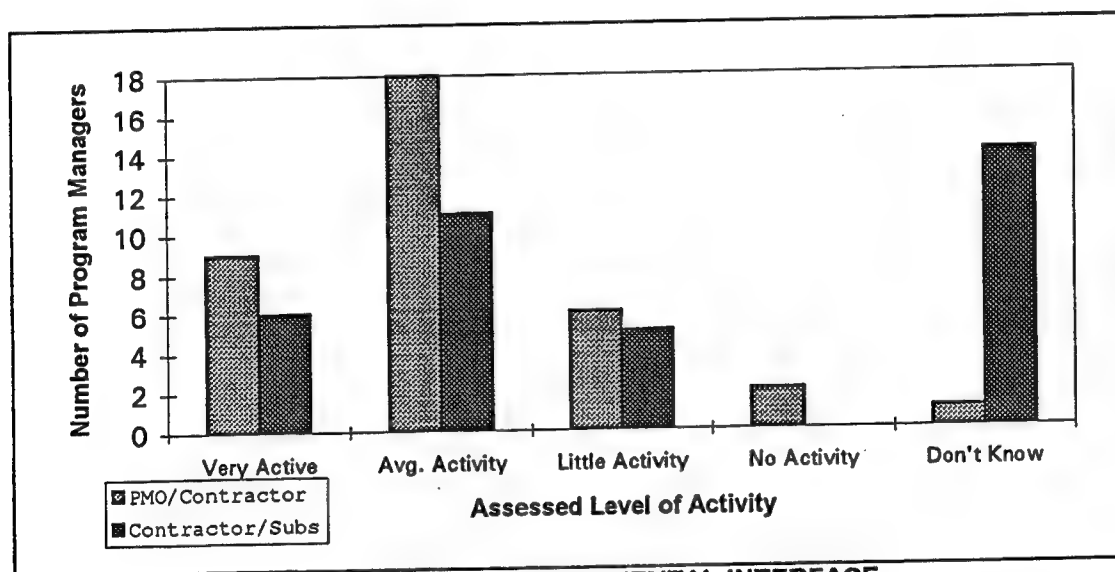
#### Contract Performance

During the interview process, PMs were asked if they considered their contractors to be quality practitioners as far as environmental performance was concerned. Of 37 managers responding to this question, only four held neutral or negative assessments of their contractor. The largely positive response is summarized in Figure 8-4.

In an effort to assess the extent of communication between program offices and contractors on environmental matters, PMs were asked to assess the level of activity between the two. Responses are shown in Figure 8-5. In similar fashion, the activity level between contractors and their sub-contractors and suppliers was assessed. That information is also at Figure 8-5.



**Figure 8-4. ENVIRONMENTAL PERFORMANCE**  
(Contractor is a "Quality Practitioner")



**Figure 8-5. ENVIRONMENTAL INTERFACE**

While PMs strongly believed their contractors to be quality environmental practitioners, only slightly over half (18) were identified as being users of environmental quality tools. It must be recognized that in the majority of situations, the most common response was a "Don't Know" as opposed to a negative. Only 4 PMs stated emphatically that their contractors did not use quality tools. Specific tools identified included:

- a. Integrated Product Teams

- b. Participative Management
- c. Preferred Supplier Program
- d. Tracking Flowdown
- e. Environmental Policy Group
- f. Requirements Tracking System
- g. Templates
- h. Statistical Process Control

#### Use of Environmental Support Contractors

Exactly 50% of the responding program offices reported the use of environmental support contractors by their offices. U.S. Army programs are the most active in use of this type of support. Table 8-2 summarizes the activity.

**Table 8-2. USE OF ENVIRONMENTAL SUPPORT CONTRACTORS**

<u>Service</u>	<u>PMOs Using Environmental Support Contractors</u>	<u>PMOs Not Using Environmental Support Contractors</u>
U.S. Army	29	18
U.S. Air Force	12	14
U.S. Navy	13	20
U.S. Marine Corps	0	3
Joint Programs	4	3
TOTAL	58	58

The PMs who were interviewed on their use of environmental support contractors (18 out of 39 reported such use) were exceptionally positive as to the quality of such efforts. Thirteen PMs stated the work performed by their environmental support contractor to be of "Excellent" quality. Four assessed the work as "Adequate" and one stated an inability to make a comparison and judgment.

#### OBSERVATIONS

##### Program Office Contracting Actions

While PMs almost universally believed their offices were doing a responsible job relative to environmental issues in contracting, there is indication that variances in performance do

exist. Though the sample is small, program offices with active teams, access to staff, on-going PEA processes and involvement in environmental documentation appear to achieve a synergy that spills over into their approach to contracting (Table 8-3). These offices are the ones, for the most part, using environmental parameters to influence contract award and performance. These efforts are effective and worth pursuing.

**Table 8-3. "ENVIRONMENTAL SYNERGY"**

<u>Profile of Programs with Environmental Contracting Initiatives</u>							
<u>Programs</u>		<u>Service</u>	<u>ACAT</u>	<u>EMT/EMG</u>	<u>Environmental Staff</u>	<u>PEA</u>	<u>Annex E</u>
-----	1	USAF	II	Y	Y	Y	Y
*							
*	2	USAF	II	N	Y	N	N
*							
Using	3	USN	III	N	Y	Y	Y
Incentive							
and/or	4	USN	Multi	N	Y	Y	Y
Award Fees							
*	5	USA	III	N	Y	Y	Y
*							
*	6	USA	I D	Y	N	Y	Y
*-----							
**	7	USAF	I C	Y	Y	Y	NR
**							
**	8	USAF	I D	Y	Y	Y	Y
**							
**	9	USN	I C	N	Y	Y	Y
**							
*Factor	10	USA	I C	N	Y	Y	Y
----- in							
Source	11	Joint	I D	Y	Y	Y	Y
Selection							
*	12	USA	III	Y	Y	Y	Y
*							
*	13	USA	NR	Y	Y	NR	Y
*							
*	14	USA	I D	Y	Y	Y	Y
-----							
Notes:-Fourteen programs above were selected from a sample of 118 responding program offices.							
-NR = No Response							

### Contract Requirements and Structure

Approximately half of the program offices reported environmental concerns had been incorporated into their Systems Engineering and Manufacturing Management Plans. Of the remainder, only a small number believed such requirements not to be

applicable to their programs. Again, about half the reporting programs stated that their contracts required the development of Hazardous Material Management and Waste Plans. Compliance needs to be monitored and improved in these areas. While maturity of the programs and associated "grandfathering" may explain some of these results, it cannot be true for every case.

Program office knowledge of the treatment of environmental clean up costs by their contractors appears to be limited. Little insight was demonstrated in this area during either the survey or interview processes. "Hidden" environmental costs to the programs may be larger than they appear and bear further investigation.

#### Contract Performance

The significant positive assessment of PMs of their contractors as quality environmental practitioners is encouraging. At the same time, the levels of communication do not appear to be as robust. Use of environmental quality tools is apparently not well developed or wide spread.

#### Use of Environmental Support Contractors

The use of environmental support contractors has been a highly successful practice.

#### RECOMMENDATIONS

##### Program Office Contracting Actions

Identification and dissemination of success stories and lessons learned should be pursued by the Services. Within each Service there are PMOs who have been aggressive and successful in integrating environmental concerns and issues into the contracting process. These efforts, while not wide spread, should be identified and expanded.

##### Contract Requirements and Structure

Environmental issues and costs need to be explicitly identified in contract actions. Such action would not only raise the visibility of such costs, but might foster the development and funding of "generic" approaches to resourcing such requirements.

#### Contract Performance

Continued emphasis on environmental performance and interaction between PMOs and contractors must be maintained. As

opportunities arise, specific quality tools should be introduced to assist and monitor environmental performance.

#### Use of Environmental Support Contractors

Environmental support contractors should be considered and used where their particular expertise can enhance program performance.



## ENVIRONMENTAL TECHNOLOGY

The use of environmentally friendly technologies has several applications in the acquisition of weapons systems. For example, such technologies can be employed in the manufacturing processes used in production, testing procedures and equipment, choice of design features and materials in the weapon system itself, maintenance procedures, and design and operation of the production facilities. There are undoubtedly other areas for application of environmentally oriented technologies in addition to those listed.

## RESULTS

A limited effort was conducted to assess how widespread the use of innovative environmental technologies was and to identify those technologies cited by Program Management Offices (PMOs). Of the 118 PMOs responding to the survey, 25 reported the use of innovative environmental technologies. These uses ranged from choice of materials in the weapon systems themselves, related maintenance procedures, associated manufacturing processes and related design decisions. The use of innovative environmental technologies, by Service, is as shown in Table 9-1. A listing of the technologies (to the degree of specificity provided by the respondents) is as shown in Table 9-2.

**Table 9-1. USE OF INNOVATIVE ENVIRONMENTAL TECHNOLOGIES**

Service	Number of Programs Surveyed	Number of Programs Reporting Use
U.S. Army	47	9
U.S. Air Force	26	6
U.S. Navy	33	7
U.S. Marine Corps	3	0
Joint Programs	9	3
TOTAL	<u>118</u>	<u>25</u>

Table 9-2. TYPES OF TECHNOLOGY

Specific

- Wheat Starch Paint Stripping
- Cadmium Plating Substitution Processes
  - Ion Vapor Deposition of Aluminum
  - Electroless Nickel Plating
  - High Velocity Oxy-Fuel Flame Spray
- Non-Cyanide Alkaline Cleaners
- Water Soluble Flux for Soldering
- Double Skinned Cargo Tanks
- Use of Biodegradable Materials
- CFC Reclamation, Recycling and Reuse System
- Sponge Jet for Depleted Uranium Cleanup
- Citrus Based Solder Flux
- Plastics Processor

General

- New Air Conditioner Coolants
- ODC Substitutes
- Low VOC Coatings
- Alternative Fire Suppression Systems

In the course of interviewing PMs (or their designated representatives), each interviewee was queried as to their knowledge of the National Defense Center for Environmental Excellence and the environmental technology services it can provide. Nineteen of forty interviewees responded in the affirmative as to being knowledgeable of the existence of the Center. However, of these nineteen, only one PM reported having made use of the Center (to obtain information pertaining to hypergolic fuels). By far, a much more common response was (sic) "Have heard of them, but haven't used them."

OBSERVATIONS

Innovative environmental technologies are being used, to some degree, by programs where their application makes sense.

The National Defense Center for Environmental Excellence is not well known to, or used by, the PM community.

RECOMMENDATIONS

Efforts be continued to foster the use of appropriate innovative environmental technologies.

Efforts should be enhanced to foster knowledge of and utilization of the capabilities of the National Defense Center for Environmental Excellence.

## ENVIRONMENTAL TRAINING

Environmental issues, and the many laws and regulatory requirements associated with them, pose many new and varied challenges to program managers (PMs) and their staffs. A major factor in accomplishing these tasks well is timely and professional training in the knowledge and disciplines required.

### RESULTS

Training in environmental fields was examined from various perspectives. The training status of individual PMs was investigated. In addition, information was obtained as to training received by members of the program office staff.

Thirty-three, or 28%, of the program offices reported that their PM had received some formal training in the environmental area (Figure 10-1). Slightly over half (63 of 118 or 53%) of the offices reported at least one member of the program office staff had received training (Figure 10-2). As shown in Figures 10-1 and 10-2; U.S. Army, U.S. Air Force and Joint Programs reported the accomplishment of a greater degree of training than the U.S. Navy and U.S. Marine Corps offices.

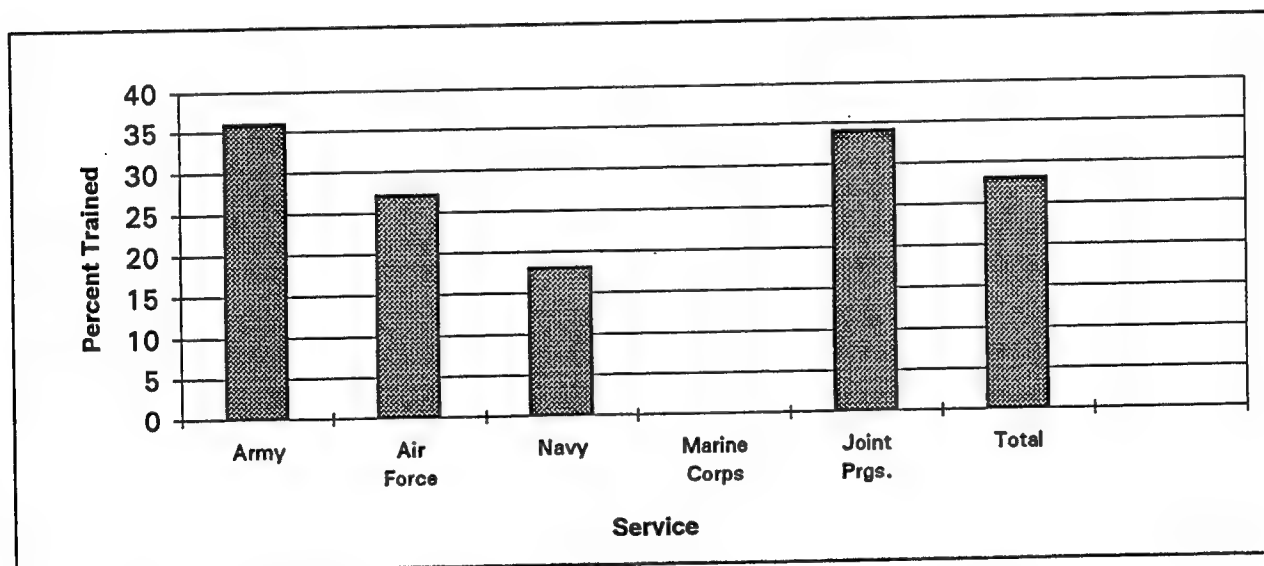


Figure 10-1. ENVIRONMENTAL TRAINING (Program Managers)

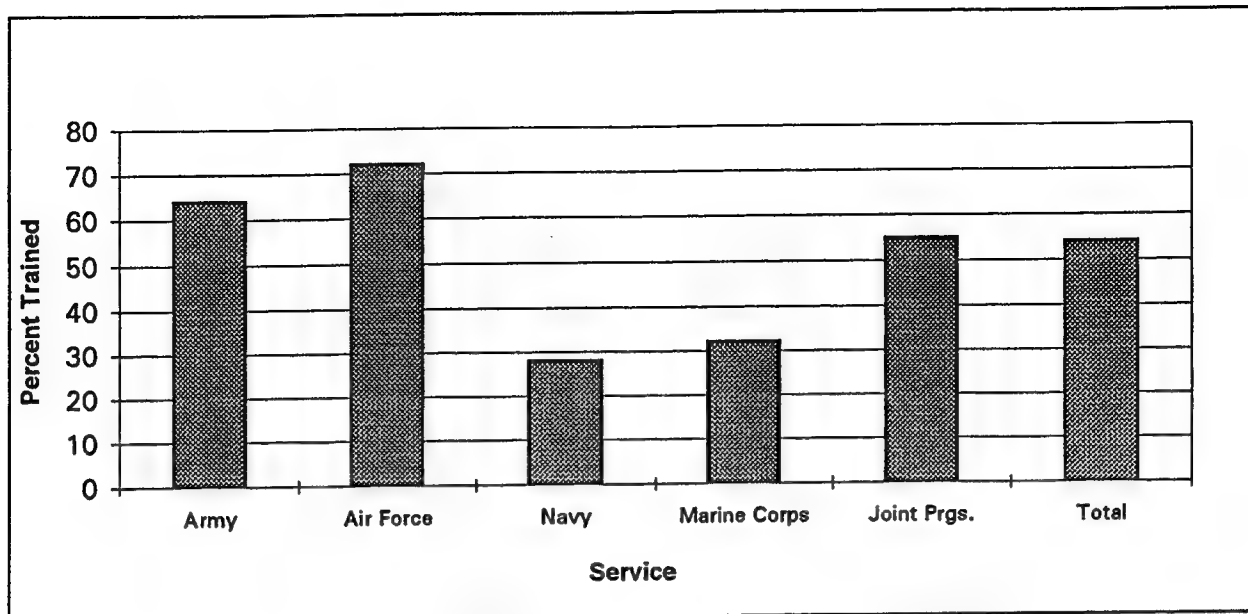


Figure 10-2. ENVIRONMENTAL TRAINING (Program Office Staff)

The distribution of trained personnel (PMs and/or staff) was investigated as to assignment across the acquisition categories (ACATs) of the programs. Figure 10-3 shows a relatively even distribution with the exception of the ACAT I C and ACAT IV programs.

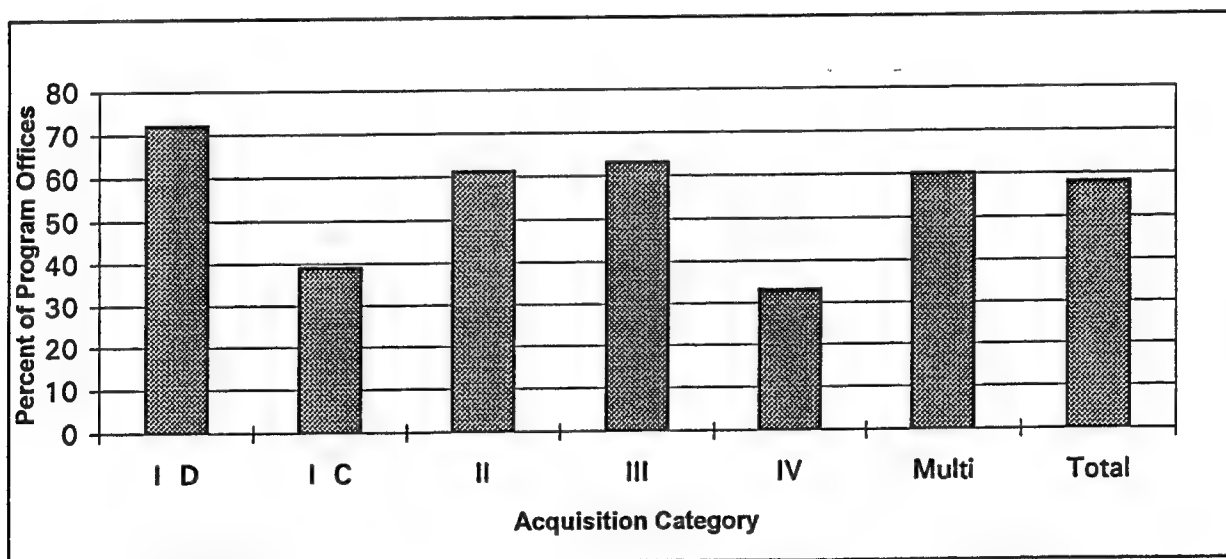


Figure 10-3. ENVIRONMENTAL TRAINING (Trained Personnel Assigned)

#### OBSERVATIONS

The level of environmental training for PMs is low. Only 28% of the serving PMs are reported as having any formal training.

Furthermore; based on the descriptions of this PM training, which were obtained during the interviews, the training was not very extensive (see Table 10-1). Training was more extensive, and apparently more robust, for the staff personnel. See Table 10-2 for comments characterizing staff training.

**Table 10-1. PROGRAM MANAGER (PM) TRAINING**

Comments Characterizing PM Training Experience

- Awareness Seminar
- PEO sponsored seminar
- PM Environmental Conference
- Covered in prospective Commanding Officer course
- Took Program Management Course (PMC) Elective
- Two day seminar
- Self-study
- Executive Enterprises Course

Note: One PM reported extensive training to include an Army Logistics Management College (ALMC) course, an Office of Personnel Management executive seminar, two formal Environmental Law courses and a number of seminars and conferences.

**Table 10-2. PROGRAM OFFICE STAFF TRAINING**

Comments Characterizing Program Office Staff Experience

- "Environmental Concerns in Acquisition"
- Two people attended one day local course
- Individual enrolled in Environmental Master's program
- Air Force Institute of Technology (AFIT) Executive Seminar
- Environmental Impact Statement Course
- Basic Introduction
- HAZMAT program review
- One week Law course
- "Environmental Aspects of Contracting"
- Executive Enterprises Course
- One week course from Army Pollution Prevention Support Office
- Army Logistics Management College (ALMC) course
- One day ODC training
- Two day course
- Three day class on Environmental Compliance
- NEPA Seminars
- Legal course
- PEO sponsored seminars

The lack of trained personnel in ACAT I C program offices is troubling (Figure 10-3). These are large and resource intensive programs and may be surmised as being of environmental significance. The U.S. Navy, with its lower training percentages, has a third of the ACAT I programs overall (Figure 10-4) and a

particularly significant share (48%) of the ACAT I Cs (Figure 10-5).

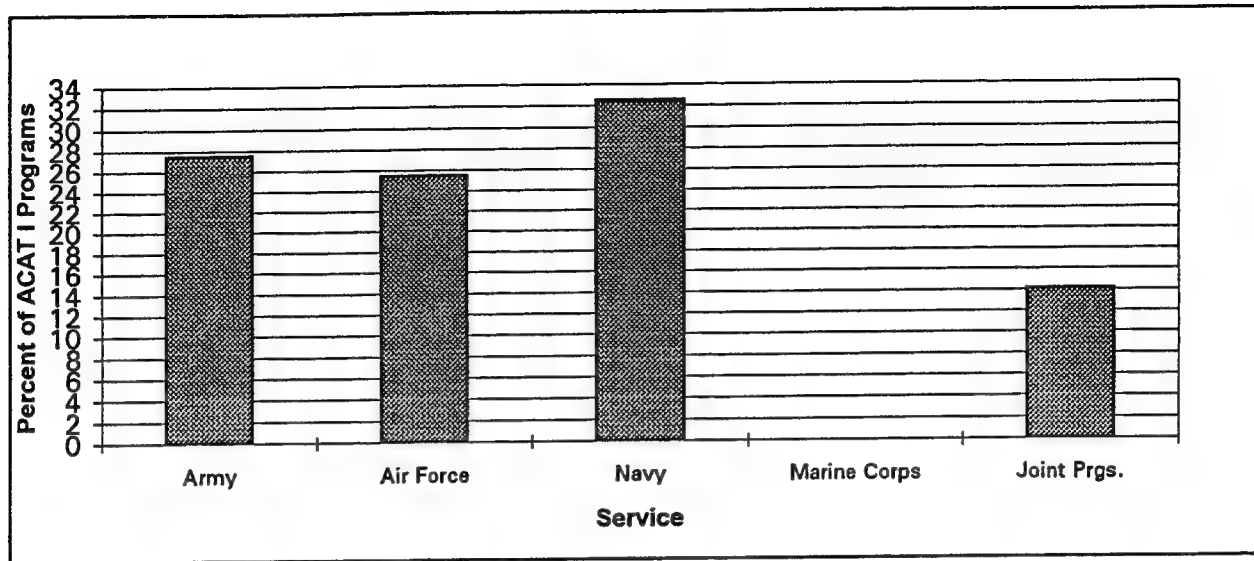


Figure 10-4. ACAT I PROGRAMS (Distribution by Service)

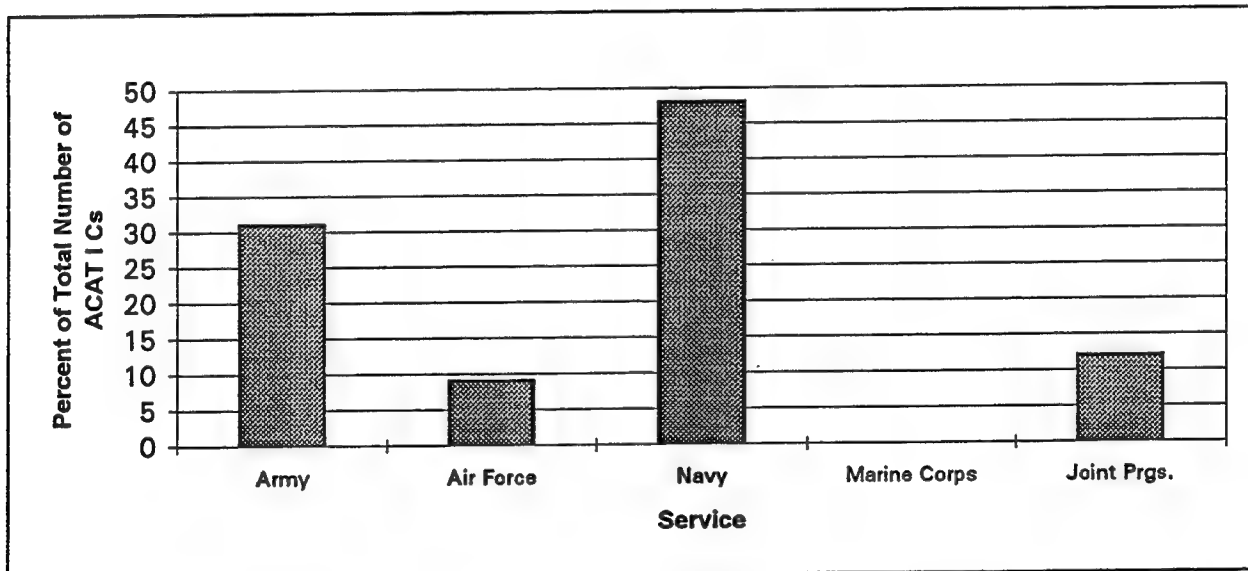


Figure 10-5. ACAT I C PROGRAMS (Distribution by Service)

## RECOMMENDATIONS

Environmental training for PMs and their staffs should be increased. Trained personnel should be assigned to the larger program offices (ACAT Is) to enhance the possibility of significant positive impact in the environmental area.

## ENVIRONMENTAL AUDITS AND INSPECTIONS

The terms "environmental audit or environmental inspection" can mean different things to different people. Audits and inspections range from formal regulatory compliance reviews to self help forms or questionnaires. The Environmental Protection Agency Environmental Audit Policy<sup>1</sup> defines an environmental audit as a "systematic, documented, periodic, and objective review by regulated entities of facility operations and practices related to meeting environmental requirements." While some audits or inspections undergone by program management offices (PMOs) may have approached this definition, most were more limited in scope.

### RESULTS

Of the 118 programs responding to the survey, 43 reported they had received an environmental audit or inspection of some type. Twenty-one of the programs audited/inspected were Major Defense Acquisition Programs (ACATs ID or IC), with the remaining twenty-two programs being a mixture of ACATs II, III and IV (see Figure 11-1).

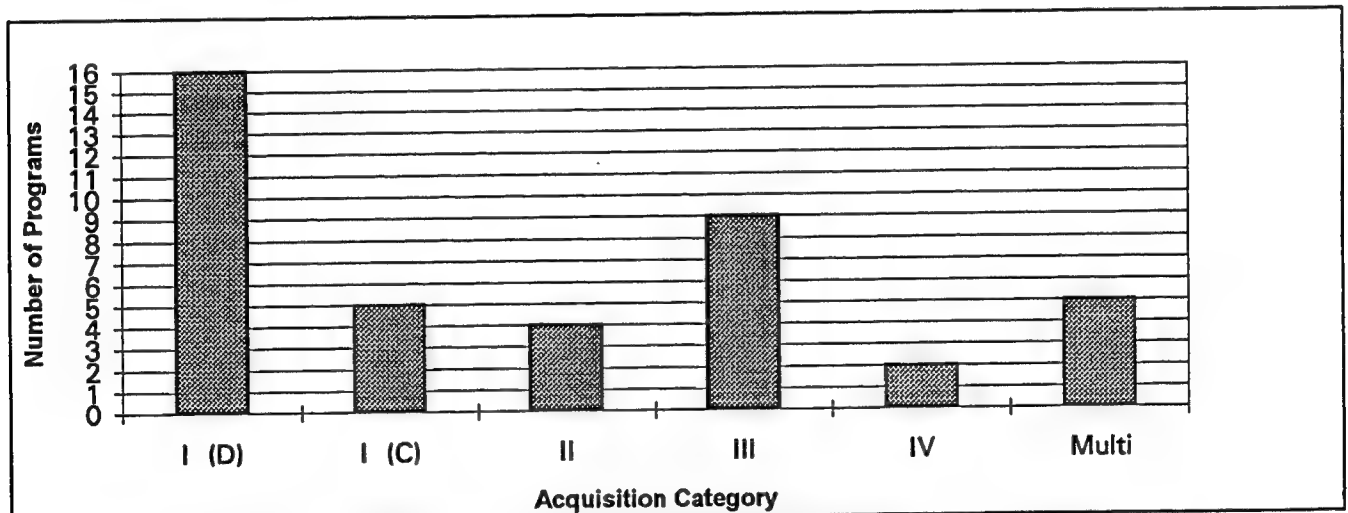


Figure 11-1. ENVIRONMENTAL AUDITS and INSPECTIONS (Acquisition Category)

In contrast to the approximately 36% of the surveyed programs, who reported being audited/inspected, only seven out of 40 programs interviewed (18%) responded that they had been

<sup>1</sup>51 Fed. Reg. 25004, 9 July 1986.

audited/inspected. All seven of these programs were either ACAT ID or IC.

Auditing and inspecting agencies identified included the General Accounting Office, Department of Defense Inspector General, Department of the Army Inspector General, Army Audit Agency, Environmental Protection Agency Regional organizations and environmental offices of supporting acquisition commands.

Thirty-one of the programs surveyed indicated they were not aware of personal liability issues that could conceivably occur because of failure to comply with environmental laws and regulations.

#### OBSERVATIONS

A general impression, based upon interview experience, is that the auditing/inspection function is not well developed and has been carried out in a somewhat limited fashion. Attention does appear to be primarily focused on the larger programs which is appropriate. At the same time, audit and inspection activity does appear to be equally spread among programs that are in all the various phases of the acquisition process.

#### RECOMMENDATIONS

Audit activities should be enhanced so as to focus attention on compliance and the avoidance of ill considered decisions and actions. Enhanced audit activities would also serve to raise awareness of compliance issues and associated possible liabilities for both organization and individual.



## IMPACTS OF ENVIRONMENTAL ISSUES ON ACQUISITION PROGRAMS

The impacts of environmental issues were investigated during both survey and interview phases of the project. Environmental impacts were addressed from several perspectives. One aspect was the issue of command emphasis or priority placed on environmental concerns in Program Management Offices (PMOs) and in their immediately superior Program Executive Offices (PEOs). Programs were surveyed to identify particular environmental issues or factors (e.g., Ozone Depleting Substances) which had impacted the program in some way. The scope of these impacts was further assessed in terms of detrimental effects on the cost, schedule and performance parameters of the program. Impacts relating to testing experience were broken out and analyzed separately.

### RESULTS

#### Command Emphasis

There was very strong indication from all the reporting program offices in the survey that environmental concerns were assessed and treated as priority issues at both PMO and PEO level. Fewer than 5% of the reporting offices disagreed with the priority categorization of these issues. Figures 12-1 and 12-2 depict the PMO responses.

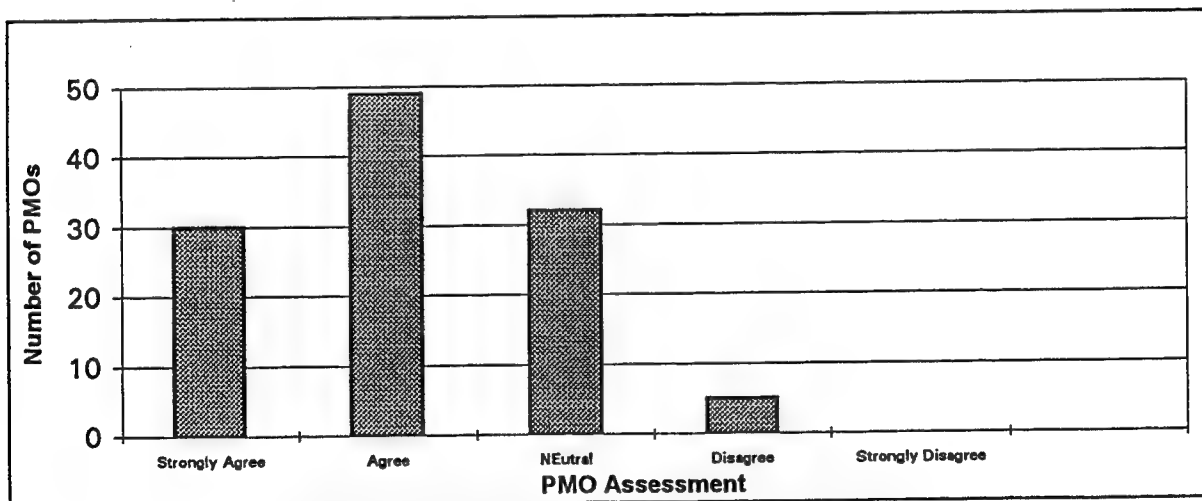


Figure 12-1. ENVIRONMENTAL CONCERNS, PMO  
(Treated as Priority Area in PMO)

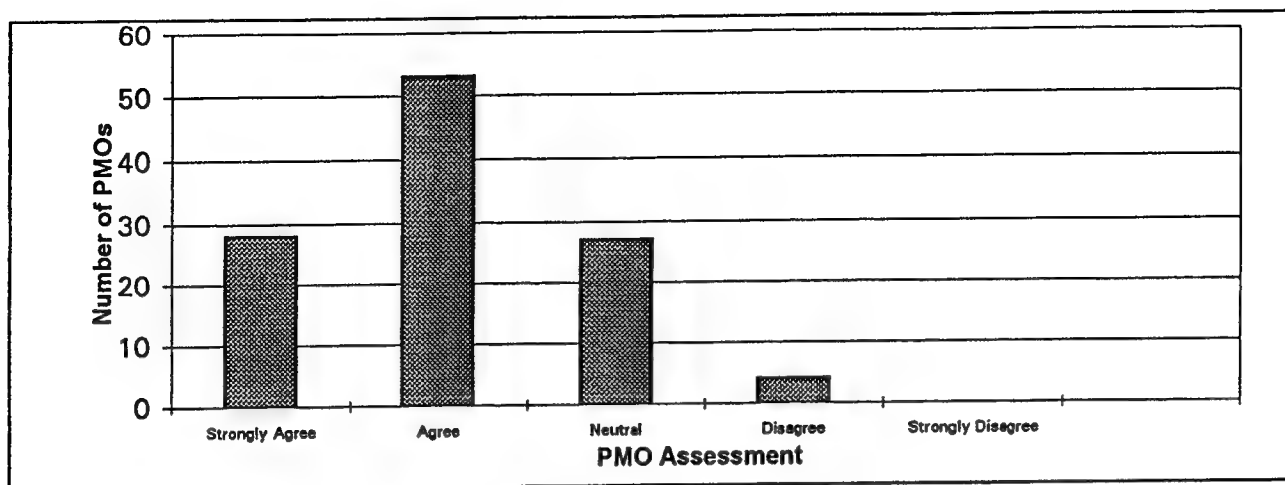


Figure 12-2. ENVIRONMENTAL CONCERNS, PEO  
(Treated as Priority Area in PEO)

In interviewing program managers (PMs), not quite the same degree of concern and priority was indicated as in the survey; however, the great majority of PMs did believe these issues to be of major concern and deserving of priority treatment. The PMs who did not single out environmental issues as a priority considered them to be among many issues with which they had to contend. No one denigrated the importance of environmental concerns. Table 12-1 provides the PM assessment.

Table 12-1. ENVIRONMENTAL ISSUES

Topic	Program Manager (PM) Assessment	
	YES	NO
Environmental Issues are of Major Concern	31	9
Environmental Issues are a Priority Area	33	7

### Environmental Factors

The PMOs were asked to identify specific environmental factors or concerns which had impacted their program. Many programs reported several factors as being of concern. It's evident that the interface between acquisition programs and many environmental issues of National concern is an extensive one. Table 12-2 describes the extent of impacting factors.

**Table 12-2. ENVIRONMENTAL FACTORS**  
(118 Reporting Program Management Offices (PMOs))

<u>Environmental Factor/Concern</u>	<u>PMOs Impacted</u>
Ozone Depleting Substances	103
Toxics	71
Volatile Organic Compounds	59
Noise	53
Petroleum Products	51
Heavy Metals	36
Endangered Species	36
Radioactive Materials	26
Historical or Cultural Site Preservation	23
Respirable Fibers	22
Others <sup>1</sup>	9
Thermal Waste	7
None	7

Environmental Impact on Program Performance

Seventy percent of the PMOs responding to the survey reported an adverse impact on their program attributable to an environmental issue. Increased cost and schedule delays were experienced by many. Degraded system performance or inability to meet system requirements were experienced by relatively few programs. The scope of adverse impacts is depicted at Table 12-3. Fifty-two programs reported adverse impacts in two or more areas (cost, schedule, performance, requirements).

**Table 12-3. ADVERSE IMPACTS**  
(118 Reporting Program Management Offices (PMOs))

<u>Impact</u>	<u>PMOs Experiencing</u>
Increased Cost	76
Schedule Delays	38
Degraded System Performance	10
Inability to Meet System Requirements	6
Other (Not further identified)	2
None	36

<sup>1</sup>Includes Air Opacity, Chemical Agent Resistant Paints & Coatings, Water Contamination, Chlorination, Human Waste Disposal and Electromagnetic Effects.

The PM interview data roughly tracked the survey information with 23 out of 40 PMs identifying adverse impacts on their programs. When asked about the details of the adverse impacts, PMs provided a rich and varied array of comments. These comments are briefly summarized at Table 12-4. Increased and unfunded costs were frequently discussed and are a wide spread issue.

**Table 12-4. PROGRAM MANAGER COMMENTS re ENVIRONMENTAL IMPACT**

- Fuel spills and associated clean up.
- We had a lawsuit.
- Aircraft crash, charred composites.
- Testing problems with noise.
- Maintenance requirements for Foreign Military Sales customers.
- Money for documentation.
- Hazardous material disposal.
- Delays in awarding contracts. Extra effort for procurement packages.
- Back fitting environmental requirements.
- Range firing delays.
- Held hostage because of size and priority.
- Redesign required. Had to retest engines.
- Limited facilities to do all testing required.
- Cost for monitoring and reporting.
- Plant closed for a pollution problem.
- Costs to procure special equipment.
- Financial Liability to the Government.

In developing the research project, the impact of environmental issues on testing activities became apparent as an issue of particular concern in the acquisition community. Consequently, this topic was specifically addressed in the survey. This area was found to have adversely impacted the testing activities of almost half of the programs reporting. Testing problems are summarized at Table 12-5.

**Table 12-5. TESTING PROBLEMS**  
(118 Reporting Program Management Offices (PMOs))

<u>Problem</u>	<u>PMOs Experiencing</u>
Increased Cost	43
Schedule Delays	24
Required Use of Surrogates	15
Unable to Meet Test Objectives	4
Other (Not further identified)	3
None	64

## OBSERVATIONS

### Command Emphasis

Most PMs and PMO personnel appear to be attuned to the importance and potential impacts of environmental concerns. While not all PMs characterized environmental issues as a priority area, all were aware and factored these issues into their decision making processes.

### Environmental Factors

Acquisition programs almost invariably have an interface with one or more environmental factors of concern. The PMs must identify and deal with each relevant factor in a responsible and effective fashion.

### Environmental Impact on Program Performance

Environmental issues impact on program performance in a great variety of ways. They frequently result in cost and schedule impacts. The factors leading to these impacts are pervasive and will continue. In some cases, impacts are more significant than they might have been had prior information and knowledge as to environmental requirements been available. Testing programs are an area of particular concern.

An ancillary issue raised by a number of PMs was the penchant of "environmental" agencies or staff elements to use programs as "cash cows" to accomplish environmental research and/or studies. In some cases, PMs reported they believed their programs were being held hostage to accomplish agendas that were unrelated to mission performance. This situation, while hopefully not wide spread, could breed ill will and a lack of cooperation between acquisition and environmental communities.

## RECOMMENDATIONS

### Command Emphasis

Command emphasis on environmental issues exists and should be maintained.

### Environmental Factors

Communications and use of appropriate media by acquisition commands and agencies should include regular periodic update and awareness information relative to environmental concerns.

### Environmental Impact on Program Performance

Lessons learned should be systematically gathered and promulgated by acquisition commands and agencies.

Acquisition commanders should be advised of unrealistic environmental study requirements being placed on program offices and assure such requirements get routed to appropriate agencies and staffs. Piggy backing "generic" environmental studies on acquisition programs should be avoided.

**ANNEX A**

**RESEARCH PROJECT PROPOSAL**

DSMC-FD-IP

August 27, 1993

MEMORANDUM FOR Dean of Faculty (Dr. Ben Rush)

SUBJECT: Proposed Research Project

1. Reference:

a. DSMC Research and Information Division, Standard Practice, RD-01, 14 November 1991.


b. DSMC Research and Information Division, Standard Practice, RD-03, 14 November 1991.

c. Memorandum, FD-IP, subject: Request for Rotational Assignment, 17 May 1993.

2. In accordance with the process outlined in reference 1.a., attached is a proposal for a research project to be conducted in the October 93 - January 95 time frame. The format specified by reference 1.b. was used to prepare this proposal.

3. This proposal project was first identified in the reference 1.c. memorandum and in the FY 94 Budget Input process (see Annex C of attached proposal). Request approval and funding of the project as specified herein.

Encl

  
GEORGE P. NOBLE III  
Chair, Integrative Program  
Management Department

CF:  
Executive Director, Research (DSMC-RD)



## RESEARCH PROPOSAL

STATEMENT OF RESEARCH PROJECT - The purpose of the research proposed is to identify and assess impacts of significant environmental issues as they interact into the weapon systems acquisition process. An attempt will be made to assess policies and procedures associated with environmental issues, and to relate them to the acquisition management systems and processes presently being used in weapon system program offices. One objective of the effort would be to codify the processes and practices being used into a "statement of valid practice" which would provide useful everyday guidance to weapon systems program managers in meeting their environmental responsibilities. A major thrust associated with this objective is the development of pro-active planning approaches. A second objective is the identification of inefficient or "missing links" in current policy and practice with regard to environmental concerns and policies. The initiative here should result in recommendation for change and/or improvement in existing regulatory guidance. Finally, it is expected that this research will result in the creation of curriculum material that will enhance coverage of this critical area in existing acquisition management courses (to include the Program Management Course) and perhaps result in the creation of a distinct course for DoD personnel whose responsibilities include a specific environmental dimension.

1. Problem Situation - Environmental degradation is a topic of major concern to virtually every American citizen. In fact, it is an issue of world wide importance. Recent years have seen a veritable torrent of laws and regulations, focused on environmental protection and remediation, that are having major impact on practically every aspect of modern civilization. The business of weapon system development and deployment occupies a unique niche in this context due to the variety of exotic and hazardous materials that are used in the systems. In addition to the weapon systems themselves, the engineering and manufacturing processes associated with the systems often pose severe environmental hazards. The Department of Defense is keenly aware of the challenges in this arena and the establishment of the office of the Deputy Undersecretary of Defense-Environmental Security emphasizes the importance of the issue. Numerous laws and regulations govern weapon systems Program Managers in their approaches to dealing with and meeting environmental concerns. What has yet to evolve is the establishment of a pro-active "practice" for Program Managers to use in the everyday management and evolution of the programs. Much of the guidance, which is proliferating at an exponential rate, is extremely detailed, highly technical in nature, confusing and sometimes contradictory. At the same time, the consideration of environmental concerns as an integral concurrent part of the acquisition process has yet to evolve.

The foundations of environmental compliance are firmly established in a large body of law applicable to environmental protection. Precedence has been established in this area whereby

the Federal Government has waived its sovereign immunity. Individual government employees are being held responsible and both criminally and civilly liable for their actions. It is incumbent upon DSMC to assure that our students are receiving the latest guidance on environmental practices in the context of accomplishing and teaching acquisition management of weapon systems. This area is of national importance and of particular importance to the Department of Defense. In the Secretary of Defense's 1992 Annual Report to Congress, he stated that the DoD had six specific goals related to the environmental challenge-one of which is "Conducting Environmental Impact Analyses and Early Planning in the Acquisition Process." In FY 93, the cost of DoD environmentally related actions is forecasted to be approximately \$3.5 billion. These costs can be expected to increase.

2. Pertinent Literature Survey - Much information exists relative to the research subject at hand. There are several Department of Defense, Military Service and other Government Agency publications and reports that pertain to the implementation of environmentally sound program management practices. A standard library assisted literature search will be conducted to ascertain the existence/availability of literature on the specific topic of environmental considerations in the execution of Program Management actions. A ROAR search has already been accomplished. In addition, key points of contact in OSD and the Services will be contacted relative to literature and information availability.

3. Past Studies That Apply to the Effort - The existence and availability of past studies is an unknown at this point. It is proposed to determine the existence and applicability of any such studies as part of the pertinent literature survey outlined above.

4. Advancement of Previously Developed Knowledge-Environmental Issues have been addressed by the DoD and the Military Services in a great variety of forums and media. The incorporation of environmental concerns into the program management discipline is of only recent occurrence. Documents that address themselves to this subject (that have been identified to date) include:

a. Life Cycle Environmental Guide for Weapon Systems Project Managers, U.S. Army Production Base Modernization Activity, October 1992.

b. The National Environmental Policy Act in DoD, Logistics Management Institute, June 1990.

c. Green Engineering, Carnegie Mellon University, in process.

d. Environmental Cost in Weapon Systems: Visibility and Disciplined Approaches, U.S. Army Aviation Systems Command, in process.

e. Materiel Developer's Guide for Pollution Prevention, U.S. Army Materiel Command, August 1992.

f. DoD 5000 series of Instructions and Directives.

g. AR 70-1, AR 200-1, AR 200-2, AFR 19-17.

The above documents, along with others yet to be identified, will be evaluated and synthesized to ascertain the key management concerns and approaches that are common to weapon system acquisition programs. Errors of omission will be identified and if possible, appropriate remedies suggested.

5. Research Question - The question that this research attempts to answer may be expressed in two parts. The first part consists of "What is current programmatic policy and practice relative to the treatment of environmental concerns in the weapon system acquisition process; and as a corollary-if there are shortcomings in policy or practice, what are the recommended solutions?" The second part of the research question deals with dissemination of information and may be expressed as "What are the appropriate media and mechanisms to disseminate needed environmental information to the field and how should such an objective be accomplished?"

6. Specific Plan - Following is a general sequence of events as they are expected to be accomplished in the course of completing this proposed research project (many events are concurrent or overlapping):

a. Initiate research project process and obtain approval of effort as a DSMC research project.

b. Develop project definitions, project schedule, milestone schedule and initial assessment of potential products.

c. Conduct literature search and compilation of existing reference material pertaining to the following:

(1) Applicable Environmental Policy

(2) Applicable Environmental Weapon System Programmatic Practice

(3) Application of Total Quality Management Tools to environmental issues

(4) Application of Risk Management Techniques to environmental issues

d. Preparation of survey instrument relative to current DoD environmental policy and practice. Survey population to include PMS, PEOs, appropriate Service and DoD Headquarters elements.

e. Conduct survey.

f. Evaluate use of Total Quality Management tools for dealing

with environmental issues and concerns, e.g., (PARETO analysis is being used in the U.S. Army Materiel Command Environmental Risk Management Program).

g. Evaluate use of risk identification assessment and management techniques to mitigate environmental risk.

h. Preparation of structured interview instrument.

i. Conduct site visits to key points of contact at Acquisition Command, Service and DoD level. Accomplish structured or semi-structured interviews.

j. Process and analyze information received through survey and structured interviews.

k. Synthesize current policy and practice.

l. Identification and development of recommendations, if appropriate, for areas of systemic shortcoming.

m. Identification and development of recommended modes and media for information dissemination.

n. Preparation of dissemination products:

(1) Policy recommendation white paper(s)

(2) Magazine or journal articles

(3) Curriculum materials

(a) Statement of competencies

(b) Statement of objectives

(c) Recommended programs of instruction

(d) Recommendations for continued actions

o. Throughout course of project, attend seminars, symposia and courses focused on subject areas of the environmental research project.

Estimates of manhours and funds required to accomplish the research project are at Annexes A and B respectively. The manhour estimate has increased approximately 100 percent from that given in the FY 94 Budget Research Project Planning Worksheet (Annex C). This increase results from exploratory research conducted to date which has provided a more comprehensive view of the effort required.

## 7. Assumptions/Limitations

a. Assumption that environmental issues are of increasing importance to the DoD and there is a need to improve weapon system acquisition practice in regard to these issues.

b. Assumption that while a great body of knowledge on the research topic exists, there does not exist a coherent "statement" of weapon systems programmatic practice to accomplish DoD environmental objectives.

8. Methodology - The methodology to be employed in the conduct of this research project is essentially interpretive in nature. It is intended to incorporate elements of historical, descriptive and action research in examining the nature of the issues involved, identification of areas of short coming and in developing recommendations for dissemination of conclusions and recommendations. Historical research will be used to assess both primary and secondary sources of information relative to past policy and practices. Descriptive research will be used to describe the current situation. Both a survey of knowledgeable individuals in key positions in the field and a structured semi-structured interview of selected individuals will be used to develop the descriptive data base. The descriptive data base will be used to identify current practice and conditions, to make comparisons and evaluations and to ascertain the actions that are being taken by various individuals and organizations in meeting environmental requirements. Action research will be based primarily on the results of the interviews and will be approached in a flexible and adaptive manner so as to maximize the opportunity to identify solutions to existing shortcomings.

As research is conducted and further information gathered, a continuous attempt will be made to further refine the conceptual research question(s) as stated in paragraph 5 above and to evolve the questions into statements of operational hypothesis or null hypothesis. The results of these efforts will be incorporated into survey and/or interview design as time and the sequence of events permits.

Throughout the research an attempt will be made to identify cause and effect relationships that are influencing the achievement of DoD environmental goals as implemented in weapon systems acquisition. Correlation and causation will be assessed, efforts made to establish the temporal antecedent-consequent nature of causal relationships identified and conclusions drawn.

## 9. Data/Facts to be Gathered

a. Environmental requirements applicable to weapon system acquisition

(1) Law

(2) DoD regulations

(3) Service regulation

b. Management practice relative to incorporation of environmental requirements

(1) DoD publications

(2) Service publications

(3) Project survey

(4) Project structured and/or semi-structured interviews

c. Total Quality Management Tools used in managing environmental concerns.

d. Risk management techniques employed in mitigating environmental risks.

e. Lessons learned relative to environmental impacts on weapon system acquisition programs.

10. Report/Data

a. Description of current practice

b. Policy and/or practice recommendations

c. Curriculum recommendations

(1) Competencies

(2) Objectives

(3) Program(s) of instruction

(4) Changes to existing courses

# Research Project - Hours Required

## FY 94 Budget Input

## Revised Estimate (15 Mos.)

Month	Researcher	Staff	Month	Researcher	Staff
Oct	0	0	Oct	20	5
Nov	20	5	Nov	36	5
Dec	24	5	Dec	50	5
Jan	0	0	Jan	50	5
Feb	30	5	Feb	75	5
Mar	86	5	Mar	125	10
Apr	30	5	Apr	80	5
May	32	5	May	80	5
Jun	74	6	Jun	125	5
Jul	46	6	Jul	80	10
Aug	69	6	Aug	125	10
Sep	35	8	Sep	125	10
Oct	30	5	Oct	80	10
Nov	30	5	Nov	80	10
Dec	20	0	Dec	20	5
TOTAL	526	66	TOTAL	1151	105

ANNEX A

# Research Project - Funds Required

FY 94 Budget Input		Revised Estimate (15 Mos.)	
Funds	Purpose	Funds	Purpose
3500	Training	1500	Dept. of Defense
6000	Travel		Environmental Symposium
1500	Statistical	3700	Environmental Leadership
	Support		for Line Managers (UVA)
		4500	Travel
11000		1500	Statistical
			Support
		11200	

ANNEX B



# RESEARCH PROJECT PLANNING WORKSHEET

Division/Department Priority Number \_\_\_\_\_

PROJECT WORKING TITLE ENVIRONMENTAL ISSUES

CUSTOMER(S)

DSMC - PROGRAM MANAGEMENT COURSE  
DOD - DEPUTY UNDER SECY FOR ENVIRONMENTAL SECURITY

DELIVERABLES & USE

WHITE PAPER - POLICY STUDY  
CURRICULUM MATERIALS - PMIC  
ARTICLE - PM MAGAZINE

SCHEDULE INFORMATION

Start NOV '93 End JAN 95

## MANPOWER ESTIMATES BY QUARTER

	FY 94				FY 95			
	1st QTR	2nd QTR	3rd QTR	4th QTR	1st QTR	2nd QTR	3rd QTR	4th QTR
Faculty	44	76	96	124	80			
In-house Staff	10	10	16	20	10			
Contract Man-hours								

\*

## DSMC PERSONNEL REQUIRED

DIV/DEPARTMENT

Leader/Researcher  
Other Researchers

GEORGE NOBLE  
LIBRARY STAFF

FD-IP  
DCOS

CONTRACTOR RESOURCES REQUIRED? Yes ☒ No \_\_\_\_\_ Dollar Estimate 1,500

DSMC FUNDING REQUIRED? Yes ☒ No \_\_\_\_\_ Dollar Estimate 9,500

EXTERNAL FUNDING ACQUIRED? Yes \_\_\_\_\_ No ☒ Dollar Amount \_\_\_\_\_

## Description of Work

Purpose of research is to identify and assess impacts of for environmental issues and the enter into the regulatory process. Not to assess policies and procedures associated with the issue and relate that to the management systems and processes being used in program office. An attempt will be made to identify costs associated with that activity and establish more efficient procedures. Funds are estimated at \$3,500, training \$6,000 total of \$1,500 contractor support (statistical work). Total - \$11,000.00.

\* NOTE: 106 HOURS OF RELATED

ANNEX B

RESEARCH PROJECT HISTORY and GENERAL DESCRIPTION

## RESEARCH PROJECT HISTORY AND GENERAL DESCRIPTION

The project was originally defined in a research proposal dated August 27, 1993. The research questions that were posed at that time were:

(1) What is current programmatic policy and practice relative to treatment of environmental concerns in the weapon systems acquisition process; and as a corollary - if there are shortcomings in policy or practice, what are the recommended solutions?

(2) What are the appropriate media and mechanisms to disseminate needed environmental information to the field and how should such an objective be accomplished?

The project involved extensive research and reading relative to environmental law, Department of Defense environmental policy, environmental policies of the Services and, to a lesser degree, the technical aspects of some of the more pressing environmental issues facing DOD Program Managers (Ozone depleting chemicals, heavy metals, volatile organic compounds, et al). In addition, the principal researcher attended various courses and/or seminars to assist in establishing the necessary knowledge framework to apply to the project. In the course of the project, a number of opportunities for allied work arose to include participation in the prototype offering of the U.S. Air Force Aeronautical Systems Center's "Acquisition Pollution Prevention Applications Course". Other related efforts included providing inputs to the OSD effort to revise the 5000 series documents pertaining to environmental management, input to the DUSD (ES/PP) effort to develop an environmental handbook and participation in the planning of appropriate education and training for the acquisition work force to implement Secretary Perry's "Comprehensive Pollution Prevention Strategy" memorandum of 11 August 1994.

Throughout the course of the project, memorandums and information were provided to appropriate Defense Systems Management College faculty to share gained information, in a real time fashion, for use in curriculum updates and initiatives. Examples include:

(1) Memorandum summarizing results of the National Security Industries Association (NSIA) "Defense Industry and the Environmental Agenda - Symposium 94".

(2) Memorandum summarizing Department of Defense Inspector General Audit Report 94-020, "Environmental Consequence Analyses of Major Defense Acquisition Programs".

(3) Memorandum summarizing the American Defense Preparedness Association's "20th Environmental Symposium".

(4) Memorandum providing Military Service environmental

organizational charts.

(5) Memorandum and information pertaining to the interim supplemental draft to DODI 5000.2.

(6) Environmental article for the Program Manager magazine entitled "The Green Aspect of Acquisition Reform". This article is to appear in the November-December 1994 issue of the magazine.

(7) Memorandum dealing with "Environmental Management in Military Aircraft Acquisition".

(8) Article outlining the research project which appeared in the August 1994 edition of the Defense Systems Management College Research Newsletter.

(9) Information on environmental training opportunities provided to PMA 251, NAVAIR.

The major data gathering initiative associated with the project was the use of a 45 question survey that was mailed to 197 Program Managers from all Services. The survey was drafted, reviewed and put into final form during the months of April-June 1994 and was mailed in July of 1994. By 8 September 1994, 118 surveys, or 60%, of those mailed had been completed and returned to DSMC. In September and October 1994, the survey information was reviewed and summarized. Summary sheets reflecting the data by Military Service were prepared as was an overall total summary sheet.

As a supplement to the survey, a structured interview was devised and interviews were conducted with 40 Program Managers, their Deputies or representatives. In this process, 21 U.S. Army, 9 U.S. Air Force and 10 U.S. Navy program management offices were interviewed. The structured interview permitted the exploration of a number of topics that had not been addressed in the survey and also explored a couple of topics previously addressed in the survey, but in greater detail. Summary sheets reflecting the structured interview results, by Military Service, as well as in total, were prepared.

Data was assembled and analyzed, from both survey and interview processes, in the August - December 1994 period. The research project report was written concurrently and completed at end of December 1994. Publication of the report constitutes completion of the project. As with many research efforts, more questions are raised or uncovered as the research progresses. Consequently, there are obviously several aspects of environmental practice in program management offices that could benefit from further research.

ANNEX C

QUESTIONNAIRE - ENVIRONMENTAL PRACTICE in  
PROGRAM MANAGEMENT OFFICES

QUESTIONNAIRE

# **ENVIRONMENTAL PRACTICE**

**IN PROGRAM MANAGEMENT OFFICES**

**PLEASE RETURN BY  
15 AUGUST 1994**



**DEFENSE SYSTEMS MANAGEMENT COLLEGE  
RESEARCH CONSULTING AND INFORMATION DIVISION  
FORT BELVOIR, VIRGINIA**



**DEPARTMENT OF DEFENSE**  
**DEFENSE SYSTEMS MANAGEMENT COLLEGE**  
**9820 BELVOIR ROAD**  
**FORT BELVOIR, VIRGINIA 22060-5565**

**SUBJECT: Environmental Practice**

The environment and its protection are receiving increasing attention in the National agenda. The Department of Defense, and in particular the acquisition community, face a number of unique challenges in meeting environmental responsibilities.

The Defense Systems Management College is interested in assessing current environmental practice in program management offices. We believe such an assessment would serve to facilitate the sharing of ideas, opinions and practices. It will also serve as a key input to the improvement of our curriculum pertaining to this critical area.

You are one of a number of Program Managers, representing all Services, who is being asked to share your views and experience on this topic. In order that the results of the assessment truly reflect the situation across the DOD spectrum, it is important that each questionnaire be completed and returned. For consistency purposes, we would appreciate your personal attention to the answers being provided so as to ensure an accurate portrayal of programmatic environmental practice. Return of the completed questionnaire by 15 August 1994 would be greatly appreciated.

You may be sure of complete confidentiality. While there are demographic questions to assist in analyzing the data, absolutely no attempt will be made to identify individual programs.

Protection of the environment is of keen interest and importance to all of us. The Department of Defense has blazed a progressive trail in this area for many years. The acquisition community has made and can continue to make significant contributions to this effort. Your response will help greatly!

**Enclosures**

*Claude M. Bolton, Jr.*  
Claude M. Bolton, Jr.  
Colonel, USAF  
Commandant

### **General Instructions and Information**

The questionnaire should take approximately 20 minutes to complete.

In all cases, we believe the questions to be self-explanatory. If you find that not to be the case, please mark up the questionnaire, as you see fit, to ensure understanding.

At the end of the questionnaire, space has been left for any other germane input you might care to make. Suggestions and ideas are always welcome at the College.

Please return the completed questionnaire in the envelope provided.

Point of contact for questions and/or assistance is Mr. George Noble, (703) 805-2525 or DSN 655-2525.



# QUESTIONNAIRE

## GENERAL INFORMATION

1. Identify the parent Service of your program management office. (Circle number)

- 1 - U.S. Army
- 2 - U.S. Air Force
- 3 - U.S. Navy
- 4 - U.S. Marine Corps
- 5 - Joint Program (Services:\_\_\_\_\_)

2. Identify the general category of the system being developed/managed by your program management office. (Circle number)

- 1 - Aircraft System
- 2 - Electronics/Automated Software System
- 3 - Missile System
- 4 - Ordnance System
- 5 - Ship System
- 6 - Space System
- 7 - Surface Vehicle System
- 8 - Other\_\_\_\_\_

3. Identify the acquisition category (ACAT) of your program. (Circle number)

- 1 - ACAT I D
- 2 - ACAT I C
- 3 - ACAT II
- 4 - ACAT III
- 5 - ACAT IV

4. Identify the current phase of the acquisition process for your program. (Circle number)

- 1 - Phase 0, Concept Exploration & Definition
- 2 - Phase I, Demonstration & Validation
- 3 - Phase II, Engineering & Manufacturing Development
- 4 - Phase III, Production & Deployment
- 5 - Phase IV, Operations & Support

5. How many personnel (spaces) are assigned to your program management office?  
(Circle number)

- 1 - Less than 10
- 2 - 11 to 25
- 3 - 26 to 50
- 4 - 51 to 100
- 5 - More than 100

## ORGANIZATION AND PROCEDURES

6. Is there an Environmental Management Team or Group (EMT/EMG) or similar organization established in your PMO? (Circle number)

- 1 - YES
- 2 - NO

7. Is there an environmental support staff available to you within your parent organization? (Circle number)

- 1 - YES
- 2 - NO

8. Have you used contracted environmental services for any purpose (e.g. Environmental Assessments, Environmental Impact Statements, Audits etc.)? (Circle number)

- 1 - YES
- 2 - NO

9. What environmental reference documents are readily on hand in your office? (Circle number(s))

- 1 - AR 200-2, "Environmental Quality: Effects of Army Actions."
  - 2 - AFR 19-2, "Environmental Planning, Environmental Impact Analysis Process."
  - 3 - SECNAVINST 5090.6, "Evaluation of Environmental Effects from Department of the Navy Actions."
  - 4 - OPNAVINST 5090.1A, "Environmental and Natural Resources Protection Manual."
  - 5 - National Aerospace Standard 411, "Hazardous Materials Management Program."
  - 6 - DODD 4210.15, "Hazardous Material Pollution Prevention."
  - 7 - DODD 6050.1, "Environmental Effects in the United States of DOD Actions."
  - 8 - DODI 5000.2, Part 6, Section I, "System Safety, Health Hazards and Environment."
  - 9 - DOD 5000.2M, Part 4, Section F, "Integrated Program Summary, Annex E."
  - 10 - 40 CFR 1500-1508, "Regulations for Implementing the Procedural Provisions of the National Environmental Policy Act."
  - 11- OTHER KEY DOCUMENT(s) \_\_\_\_\_
- 
-

10. Current guidance for environmental compliance by the Program Office is adequate.  
(Circle number)

- 1 - Strongly agree
- 2 - Agree
- 3 - Neither agree nor disagree
- 4 - Disagree
- 5 - Strongly disagree

11. Have you been advised of your personal liability for non-compliance with environmental laws? (Circle number)

- 1 - YES
- 2 - NO

12. Has a Programmatic Environmental Analysis (PEA) been initiated for your program? (Circle number)

- 1 - YES
- 2 - NO

13. Has any NEPA documentation (CATEX, EA, EIS) been required for your program? (Circle number)

- 1 - YES  
2 - NO ----> Go to Question 15

14. Who prepared the NEPA documentation for your program? (Circle number)

- 1 - PMO Staff
- 2 - Component Staff Agency
- 3 - Contractor
- 4 - Other \_\_\_\_\_

15. Has an Annex E (Environmental Analysis) been prepared for the Integrated Program Summary (IPS) for your program? (Circle number)

- 1 - YES  
2 - NO ----> Go to Question 17

16. Who prepared the Integrated Program Summary (IPS) Annex E for your program? (Circle number)

- 1 - PMO Staff
- 2 - Component Staff Agency
- 3 - Contractor
- 4 - Other \_\_\_\_\_

17. Are major environmental events (requirements), such as an EIS, shown on the program's master schedule? (Circle number)

- 1 - YES
- 2 - NO

18. Has an environmental audit, of any type, been conducted on your program? (Circle number)

- 1 - YES
- 2 - NO

19. Do you make use of any environmental management software to assist in planning? (Circle number)

- 1 - YES
- 2 - NO -----Go to question 21



20. Name programs/packages used.

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## IMPLEMENTATION IN CONTRACT ACTIONS

21. Military specifications and standards that were specified for use in our contract were screened for environmental impact (e.g. use of hazardous materials). (Circle number)

- 1 - YES
- 2 - NO
- 3 - PARTIALLY ----->Explain below

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22. Are environmental concerns identified in the Systems Engineering Master Plan (SEMP) for your program? (Circle number)

- 1 - YES
- 2 - NO

23. Are environmental concerns identified in the Manufacturing Management Plan for your program? (Circle number)

- 1 - YES
- 2 - NO

24. The program office has made use of incentives and/or award fees, in its contracts, to encourage environmental compliance. (Circle number)



1 - YES

2 - NO ---->Go to question 26

25. Incentives and/or award fees have proven to be an effective means of encouraging contractor environmental compliance. (Circle number)

1 - Strongly agree

2 - Agree

3 - Neither agree nor disagree

4 - Disagree

5 - Strongly disagree

26. In our contracts, costs and liabilities for potential environmental non-compliance or damage are well-delineated between the PMO and contractors. (Circle number)

1 - Strongly agree

2 - Agree

3 - Neither agree nor disagree

4 - Disagree

5 - Strongly disagree

27. Our contractor's overhead rate includes environmental clean-up costs. (Circle number)

1 - YES

2 - NO

3 - DON'T KNOW

28. Our contractor's past environmental performance was a factor in our source selection process. (Circle number)

1 - YES

2 - NO

29. Our prime contract includes a requirement for a contractor-developed Hazardous Materials Management and Waste Plan. (Circle number)

1 - YES

2 - NO

3 - Not Applicable

## **DEALING WITH ENVIRONMENTAL RISK**

30. Are environmental concerns integrated into the risk management process for your program? (Circle number)

- 1 - YES
- 2 - NO

## **FUNDING**

31. Our process for determining environmental funding needs is adequate. (Circle number)

- 1 - Strongly agree
- 2 - Agree
- 3 - Neither agree nor disagree
- 4 - Disagree
- 5 - Strongly disagree

32. Are environmental requirements and costs addressed in the COEA for your program? (Circle number)

- 1 - YES
- 2 - NO

33. Are estimated environmental costs included in the program's Life Cycle Cost Estimates? (Circle number)

- 1 - YES
- 2 - NO

## **TRAINING**

34. Do you (the PM) have any formal training in the environmental area? (Circle number)

- 1 - YES
- 2 - NO

35. Do any members of your staff have any formal training in the environmental area? (Circle number)

- 1 - YES
- 2 - NO

## TESTING

36. Environmental issues have impacted on the testing of our program in the following areas:  
(Circle number(s))

- 1 - Increased costs
- 2 - Schedule delays
- 3 - Required use of surrogates
- 4 - Unable to meet test objectives
- 5 - No or negligible impact
- 6 - Other \_\_\_\_\_

## ENVIRONMENTAL TECHNOLOGY

37. Does your program make use of any innovative environmental technologies? (Circle number)



- 1 - YES
- 2 - NO ---->Go to question 39

38. List innovative environmental technologies being used by your program.

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## USE OF ENVIRONMENTAL QUALITY MANAGEMENT TOOLS

39. Does your PMO make any use of Environmental Quality Management tools in managing environmental requirements? (Circle number)



- 1 - YES
- 2 - NO ---->Go to question 41

40. Name and briefly describe the use of environmental quality tools in your PMO.

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## IMPACTS ON PROGRAM

41. Environmental concerns are priority issues within our PMO. (Circle number)

- 1 - Strongly agree
- 2 - Agree
- 3 - Neither agree nor disagree
- 4 - Disagree
- 5 - Strongly disagree

42. Environmental concerns are priority issues within our parent PEO. (Circle number)

- 1 - Strongly agree
- 2 - Agree
- 3 - Neither agree nor disagree
- 4 - Disagree
- 5 - Strongly disagree

43. Our program has had to deal with the following environmental concerns. (Circle number(s) of all that apply)

- 1 - Ozone Depleting Substances
- 2 - Volatile Organic Compounds
- 3 - Toxics
- 4 - Petroleum Products
- 5 - Radioactive Materials
- 6 - Heavy Metals
- 7 - Noise
- 8 - Respirable Fibers
- 9 - Thermal Waste
- 10 - Endangered Species
- 11 - Historical or Cultural Site Preservation
- 12 - None
- 13 - Other \_\_\_\_\_

44. What impacts has your program experienced due to environmental issues? (Circle number(s) of all that apply)

- 1 - Increased Cost
- 2 - Schedule Delays
- 3 - Degraded System Performance
- 4 - Inability to Meet System Requirements
- 5 - None
- 6 - Other \_\_\_\_\_

45. Please describe here (or on additional paper) any other issues germane to environmental considerations that you would like to raise.

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**ANNEX D**

**INTERVIEW OUTLINE**

## INTERVIEW OUTLINE

### General Information

Service \_\_\_\_\_

Program \_\_\_\_\_

ACAT \_\_\_\_\_ Phase \_\_\_\_\_

### Importance

1. Have environmental issues been of major concern within your program?

Yes No

2. Would you characterize environmental issues as a priority area for your program?

Yes No

3. Do you believe that environmental issues get the level of attention they deserve?

Yes No

4. If not, why not?

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5. Have there been adverse impacts on your program due to environmental issues?

Yes No

6. If yes, in what areas?

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### Organization and Procedures

7. Survey Question: Do you have an EMT/EMG in the PMO? (6)

Yes No

8. If yes, list the position titles of the PMO staff members assigned to the EMT/EMG: \_\_\_\_\_

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9. Are they a decision making body?

Yes No

10. If not a decision making body, what is their function? \_\_\_\_\_

\_\_\_\_\_

11. Is their advice realistic?

Yes No

12. Survey Question: Is there an environmental support staff available to you from your parent organization? (7)

Yes No

13. If yes, how would you assess the quality of the support they provide to your office.

Excellent/Adequate/Inadequate/Haven't used

14. With what environmentally oriented staffs/organizations (external to your parent organization) has your office worked?

\_\_\_\_\_

15. How would you assess the quality of the support provided?

Excellent/Adequate/Inadequate

16. Survey Question: Have you used contracted environmental services? (8)

Yes No

17. If yes, how would you assess the quality of the work that was done for your office?

Excellent/Adequate/Inadequate/Cannot judge

18. Survey Question: Environmental guidance is adequate? (10)

Strongly agree/Agree/Neither/Disagree/Strongly disagree

19. Additional guidance is needed in the following areas of environmental concern and/or requirements: \_\_\_\_\_

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

20. Survey Question: Has a PEA been initiated for your program?  
(12)

Yes No

21. If yes, our Programmatic Environmental Analysis (PEA) could be described as well organized, complete, robust and candid.

Strongly agree/Agree/Neither/Disagree/Strongly disagree

22. Survey Question: Has NEPA documentation been required? (13)

Yes No

23. If yes, what was it?

CATEX/EA/EIS

24. Is the documentation complete, realistic, robust and candid?

Yes No

25. Has there been public disclosure, discussion and/or feedback on the program?

Yes No

26. If there was an EIS, was it completed prior to CDR?

Yes No

27. Survey Question: Has an Annex E been prepared? (15)

Yes No

28. If yes, did the Annex E clearly describe the environmental consequences to support the decision making process?

Yes No Partially

29. Did the Annex E specify mitigation actions to be taken?

Yes No

30. Survey Question: Has your program received an environmental audit? (18)

Yes No

31. If yes, what areas of the program did the environmental audit cover? \_\_\_\_\_

32. Who did the audit? \_\_\_\_\_

33. If an environmental computer application program to support such functions as environmental planning, integration of environmental requirements and drafting of the PEA were to be developed, what attributes would be most important to your organization? \_\_\_\_\_

34. Are environmental issues addressed and discussed during program reviews?

Frequently/Sometimes/Never

35. Procedures and processes within the program office are adequate to assure environmental compliance?

Strongly agree/Agree/Neither/Disagree/Strongly disagree

#### Implementation in Contract Actions

36. The program office does a responsible job in specifying environmental compliance requirements in its contract documents and actions.

Strongly Agree/Agree/Neither/Disagree/Strongly disagree

37. Survey Question: Our contractor's overhead rate includes environmental clean-up costs? (27)

Yes No

38. If yes, what percentage of the overhead rate is attributable to clean-up costs? \_\_\_\_\_

39. We consider our contractors to be quality practitioners as far as environmental performance is concerned.

Strongly agree/Agree/Neither/Disagree/Strongly disagree

40. Describe the interface between your program office and your prime contractor's environmental element.

Very active/Average Activity/Little Activity/Non-existent

41. Describe the environmental interaction among your prime and his sub-contractors and suppliers.

Very active/Average Activity/Little Activity/None/Don't Know

42. Does your contractor make use of environmental quality tools in managing environmental requirements?

Yes No

43. If yes, name and briefly describe the use of quality tools by your contractor: \_\_\_\_\_

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

#### Funding

44. Survey question: Environmental costs are identified in program funding documents. (32)

Yes No

45. If yes, what percentage (or other measure) of program funds are tied to environmental requirements? \_\_\_\_\_

\_\_\_\_\_  
\_\_\_\_\_

46. Environmental costs are incorporated in the Logistics Support Analysis (LSA) for the program?

Yes No

Training

47. Identify any formal training courses that have been taken by yourself or anyone in the PMO. \_\_\_\_\_

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Technology

48. Our PMO is aware of the National Defense Center for Environmental Excellence and the environmental technology services it can provide.

Yes

No

## REPORT DOCUMENTATION PAGE

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